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INTELLECTUAL AND DEMOGRAPHIC VARIABLES AND

THE SUCCESSFUL ADULT TRAINEE

by

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ABSTRACT

A group of 170 adults, provided with the opportunity for academic education at the pre-post-secondary level, constituted the sample for the study. 32 males and 15 females who discontinued training during the first five months were compared with 60 males and 63 females who succeeded in completing one or more semesters of academic upgrading. All subjects were monitored on 11 demographic variables and 16 indices of intellect derived from WAIS results.

The demographic variables examined were: sex, age, marital status, type of residence, number of dependents, pre-training employment status, dependence on social assistance, previously completed grade level, years away from formal schooling, training goal and disability basic to the need for re-training. Intellectual indices examined were: all WAIS subtest scores, Verbal I.Q., Performance I.Q., and Full Scale I.Q., and two generated variables reflecting Verbal I.Q. and Performance I.Q. disparities.

Results obtained through analysis of variance indicate that, for male trainees, the demographic variables of maritial status, type of residence during training and number of dependents were related to success. Among measures of intellect, the Similarities and Picture Completion subtests were found to discriminate between successful and unsuccessful candidates.

For female trainees, the demographic variables of type of residence and pre-training grade level were found to be related to success. Intellectually, the Information, Comprehension, Arithmetic

Similarities and Picture Completion subtests were found to discriminate between successful and unsuccessful females.

The findings were interpreted firstly, as evidence that there was an interaction between demographic and intellective factors in relation to success among adult trainees and secondly, as an indication that some WAIS subtests have predictive validity for adult trainee selection procedures.

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CHAPTER I

INTRODUCTION

The development of human potential, as a legitimate function of
government, has been publicly accepted only recently in Canada. Less than
four years ago the legislature in the Province of Alberta accepted Premier
Manning's white paper on human resources. In keeping with the principles
propounded in that document, the Province brought certain organizations
into being. These new arms of government included the Human Resources
Research Council, the Advisory Council for Human Research, and the Human
Resources Development Authority. In addition, the Department of Welfare
was reconstituted as the Department of Social Development.

Within the Provincial Government's official proclamation, there
were references made which were obviously in support of a program for
developing human resources by providing further education for adults. The
white paper recognized that a significant proportion of the men and women
who are now eligible for employment will require further education and
training in order to live satisfactory and productive lives. At the same
time this statement of policy pledged continuing support for "retraining
and adult education programs" (Manning, 1969, p. 84). In order to implement
the ideals and values embodied in this important document the primary
purpose of these adult education programs should logically be the martial-
ling for service of previously unused human potential.

In spite of the unquestionably noble aims set forth in the Alberta
Government's white paper of 1967, it is by no means evident that all

government agencies now involved in the training of adults operate from a human resources development approach to education. At the same time as the Province was establishing its priorities in regard to human resources, the Government of Canada was entering the field of adult training through the Department of Manpower and Immigration. The Occupational Training for Adults Act (1967) appears to have been based on the premise that a significant number of adults must receive further education and be re-trained in order to meet the economic manpower needs of the nation. Funds to support the academic upgrading of adults were made available under the O.T.A. (1967) Act on the ground that economists have found a correlation between the level of education in national labor forces and total productivity (Schonfield, 1969).

In view of these obvious differences between the primary objectives of the Federal and Provincial authorities who have established the presently operating government sponsored adult training programs, one should not be surprised that there are differences of opinion about the best procedures to be used when implementing educational upgrading projects. There are indeed indications in the literature that the entrance of the senior government into the field of education is seen by some qualified educators as a threat to the human resources development approach to adult education (Souch, 1969; Villett, 1970). There is, therefore, some feeling among educators that the field of education, which is constitutionally a Provincial responsibility, should be freed from the economy-oriented policies which are being imposed on it by the Federal agencies who are now involved in adult manpower development programs.

For the purpose of clarifying the situation in regard to the training and retraining of adults in the Province of Alberta, the Human Resources Research Council has already sponsored a 'preliminary and descriptive study' (Schonfield, 1969). This study did not, in and of itself, support the position of either the Federal or Provincial authorities in relation to adult education. In practice, the Schonfield Report asked searching questions of both the approaches to training that are being considered here. On the one hand, it questions the validity of an approach to manpower development that is apparently based primarily on a discovery that there is a correlation between education and productivity in a nation's labor force. On the other hand, the report also questions whether a program of remedial education for 'academic under-achievers of average intelligence' is in itself carrying out the intentions of a vocational training program for adults (Schonfield, 1969, p. 34f).

It can be argued, then, that research in the field of adult education for vocational upgrading has a considerably more important function to perform than the mere evaluation of particular programs. It could be contended that the legitimate aim of research among adult trainees is the exploration of the real needs and the discovery of the full potential in those men and women who are becoming candidates for adult education programs. Once having identified the needs and capacities which are unique to the adult who is willing to return to school, researchers can then make a contribution to the laying of sound foundations on which to build better adult training programs.

Within the Province's white paper on human resources there was,
indeed, strong emphasis on research as the only sound foundation on which
to build programs for the purpose of developing human potential. In
keeping with this approach, personnel within the Division of Vocational
Education have opened the way for this present investigation. It is
intended that this study should make a further contribution toward a
discovery of the unique needs and potential contributions to society which
are inherent in adult trainees. This study is a partial answer to the
question, as broadly stated in the Schonfield report: "Are the right
people being trained and are they provided with the right type of training?"
(Schonfield, 1969, p. 2).

Overview of This Study

Subsequent to the approval of the Occupational Training of Adults
Act (1967), the Government of Canada has sponsored some 800,000 adult
trainees at a cost to the taxpayers of more than $535,000,000. Since
education is constitutionally a Provincial responsibility, adults within
the Province of Alberta have been trained by the Division of Vocational
Education of the Alberta Department of Education.

In order to expedite such a large program, many assumptions had to
be made and acted upon before adequate research could be done. The purpose
of this study was, therefore, to evaluate a portion of the procedure
presently followed in the selection of candidates for training under the
Alberta Vocational Training (AVT) program of the Divison of Vocational
Education.

A sample of adult trainees who had had the opportunity to complete one semester (five months) or more of academic education was selected from the population of all the adults who were given the Wechsler Adult Intelligence Scale (WAIS) prior to being accepted into training. This sample was divided into subgroups on the basis of whether or not subjects had been successful in a selected program of academic education. The subgroups of trainees who did not succeed were compared with those groups of adults who had successfully completed one semester or more of basic upgrading.

In this initial study, the emphasis was on intellectual and demographic variables. Some of these variables have been found to be related to success in academic training. The implications of these findings are discussed.

CHAPTER II

REVIEW OF RELATED LITERATURE

An examination of the literature reveals that no great backlog of research into the efficacy of adult upgrading is available. Since national programs of adult training are a relatively recent development, the total literature on the subject appears to be (a) one journal article; (b) six doctoral dissertations based on studies on manpower trainees in the United States; (c) one study of trainee characteristics sponsored by the Canadian Government and (d) two reports of surveys on adult trainees in Alberta.

Gavales (1966) reports a study investigating the effectiveness of a combined counselling and vocational training program. He was interested particularly in the changes in personal adjustment observed in his subjects. Using the Manson Evaluation Test in a pre and post-test design, Gavales concluded that there were significant improvements in the test scores following training. However, the conclusions of his study must be accepted with reservations since there was no control group. It is not possible to determine whether the variance recorded was due to the program or to other uncontrolled factors.

Quinn (1965) studied a sample of 160 high school dropouts (Note: the word 'dropout' appears to be used regularly in research literature for the purpose of designating a person who did not complete the full course of high school education as it is available in the public education system). Quinn's subjects were registered in a city training program for the purpose

of vocational upgrading. He compared his subjects with a control group for the purpose of determining the influence of the program on social relationships. Data were obtained through the administration of the California Test of Personality in a pre and post-test design. In addition, a questionnaire on personal and family history was administered to obtain demographic data. Results indicated significant changes in personal and total adjustment ratings. However, unexpectedly, it was found that the control group exhibited more change than the experimental group. Quinn had to conclude that "involvement with the academic and/or vocational upgrading does not, in and of itself, bring about changes in personal and social adjustment on a short-term basis".

Jones (1966) reports on a study to determine the effects of United States Manpower Development Training Act (MDTA) education on the socio-psychological and socio-economic status of 151 subjects. His design featured a control group of matched pairs. Three instruments - selected scales of the California Personality Inventory, the Gough-Sanford Rigidity Scale and the Maslow Security-Insecurity Inventory - were administered. In addition to the three tests, data was obtained from two structured interviews with each subject and personal interviews with MDTA instructors. Jones concluded that there were significant improvements in both of the variables under consideration. While Jones has shown that the MDTA program has both psychological and economic value, he did not determine from his data whether there were demographic or personality variables which might be of special significance in predicting success in adult training.

Bartlett (1967), working with 158 MDTA trainees undergoing

vocational upgrading in a variey of skill areas, obtained some interesting results. Measurements were made using the Adjective Check List and the Vocational Maturity Scale of the Vocational Development Inventory. Bartlett discovered several relationships between vocational maturity and psychological needs. He also concluded that trainees who began their training with psychological needs compatible with deference to classroom activities are more likely to continue after the first month. Conversely, he found that subjects who have psychological needs incompatible with classroom activities tended to terminate training before the end of the first month. Since there is no report available on his statistical treatment of data, we have no way of further evaluating Bartlett's study.

In another related study, 376 male high school dropouts in a manpower training center were observed by Spencer (1968). Spencer dichotomized his sample on the basis of whether or not the subjects completed the course of training in which they were enrolled. Correlations between success and variety of personal and social variables were discovered. For example, non-veterans and rural trainees tended to complete training more often than other subjects. No significance was found in such variables as years of schooling, age, number of dependents, years of work experience or number of months employed on the last job prior to training. These same subjects were also administered the General Aptitude Test Battery (GATB). Interestingly, the GATB was found to have no value as a predictor of early termination from training or program completion.

Hurkamp (1968) studied attitudes among 595 adults in a state sponsored education program. She developed an instrument for the purpose

of comparing some initial attitudes among students who completed their courses with the initial attitudes of those who terminated early. Specifics of her study are not available, other than the statement that there were seven correlations between initial attitudes and success. Questions concerning success or failure in a course, time spent away from home and family, participation in "open house" activities, quality of instruction, previous school experience, amount of education desirable and level of difficulty of a course all appeared to elicit significantly different attitudes. The whole area of attitudes which Hurkamp has investigated deserves further consideration.

In a major study, Trooboff (1968) surveyed 1,506 former MDTA trainees to discover relationships between trainee characteristics and success in employment following upgrading. Of the total sample 1,062 had graduated while 444 terminated before completing their courses. Using a complex statistical procedure, Trooboff correlated trainee characteristics with length of time employed after upgrading. He concluded that there was significance in the relationship between several "responsibility factors" and the length of time employed following training. Among the significant responsibility factors were marital status, family status, number of children, number of dependents, wage earner status and whether or not trainees lived with parents. However, even while concluding that such factors were significant, Trooboff questioned the value of establishing enrollment criteria and suggested that training programs be adapted to the individual "as one finds him".

On the Canadian scene, Schonfield (1969) appears to have produced the only major report on adult training which is readily available. In his report, prepared at the request of the Alberta Human Resources Research Council, Schonfield indicated that he was able to find only one previous study in which adult trainees in Canada were compared with the population as a whole. That particular study of trainee characteristics was, however, labelled "Confidential" by the Department of Citizenship and Immigration by whom it was sponsored in 1965-66. Its results are, therefore, available to us only through the Schonfield report.

Schonfield, as has been noted, concentrated on the gathering of descriptive statistics in order to examine the extent and nature of adult training in Alberta. His study was, in effect, a description of things as they were in 1969 with suggestions as to the direction in which research into adult training practices ought to be going. As literature on the subject of adult training, the Schonfield report presented evidence that virtually no research had been done in order to determine those factors which are particularly important in the selection of adult candidates for training.

In the Province of Alberta, Souch, Romaniuk and Field (1969) appear to have conducted the only study in which the intellectual characteristics of adult trainees have been examined. To a sample of 50 adult students, randomly selected from the Alberta Vocational Centre in Edmonton, they administered the Wechsler Adult Intelligence Scale (WAIS). Their results indicated that adult trainees in the Edmonton area were not significantly different in intellectual capacity from the general population. They

found, however, that the sample tended to be deficient in those intellectual functions which are most closely related to success in academic education, that is in reading skills, mathematical facility and verbal fluency. At the same time, the sample was found to be generally strong when performing tasks which required practical reasoning ability. Since the adult trainees who made up this particular sample were actually in training at the time of the study, it was not possible to determine whether or not the intellectual variables, as measured by the WAIS, were related to success. Souch, Romaniuk and Field noted the absence of information regarding drop-outs from the Alberta Vocational Centre program.

Souch, Romaniuk and Field (1969) have reported, in the same paper, a study of another 100 adult trainees also randomly selected from the Alberta Vocational Centre, Edmonton. This sample was asked to complete the Mooney Problem Check List (Adult Form, 1950) and a specially designed Student Information Survey (SIS). The results provided some useful descriptive information concerning the problems and demographic character-istics among adult trainees in the Edmonton area. Again, since unsuccess-ful students were not included as a separate group, the study did not provide information directly related to the problem of predicting success when selecting candidates for adult training programs.

While reviewing the literature in the field of state sponsored adult training, it is evident that there has been a distinct change in the focus of interest. Earlier studies on vocational upgrading were concerned to relate adult training with personal and social changes. More recently, however, researchers in the field have begun to concentrate on those factors which are instrumental in determining the success or failure of

students in government supported adult training programs.

Such research as has been done in the Province of Alberta, therefore, has been evaluative in nature. Both the Schonfield report and the studies done at the Alberta Vocational Centre, Edmonton have attempted to determine what, in fact, is the nature of the population of adult trainees. On the basis of their findings, these researchers have then discussed the implications of their findings for the theory and practice of academic upgrading for the purpose of vocational improvement. This present study fits clearly within the mainstream of research as it is now being carried on in the Province of Alberta.

In summary, the research literature reviewed heretofore seems to point out that by and large demographic and personality factors alone have not been found to be of great significance in determining which candidates are most likely to be successful in adult training programs. Except for one Edmonton based study, the literature shows a lack of interest in intellectual factors. No study, to date, has reported an investigation of the relationships between intellectual variables and success in adult training. The present study, then, examines an area which has not previously been explored. A variety of demographic and intellectual variables are studied in relation to a sample of 170 adult trainees who represent both successful and unsuccessful students. Since no previous studies have found strong evidence that demographic factors alone were instrumental in determining whether students succeeded or failed, we proposed to test the hypothesis that some of these demographic variables would be found to be significantly related to success among adult trainees when operating in conjunction with important intellectual variables.

CHAPTER III

DESIGN AND PROCEDURE

This study features a purely ex post facto research design (Kerlinger, 1964). The dependent variable was the success or lack of success, among adult trainees in a government-sponsored basic academic upgrading program. The general plan of research, therefore, was to look backward from the fact of success or lack of success in adult training and attempt to find as many as possible of the variables which were at work during the time these particular adults were being trained. The aim of this research plan was to discover relationships between those independent variables which were available for study and the dependent variable which was success or lack of success among adult trainees.

The Population

Counsellors in the Division of Vocational Education, charged with responsibility for deciding which applicants shall be accepted as candidates for adult training, have employed the Wechsler Adult Intelligence Scale (WAIS) since 1968. The population, from which the sample used in this study was drawn, consisted of every applicant for training to whom the WAIS was administered during the period between July 1968 and January 1970. It was found that a total of 301 applications for training under the Division of Vocational Education program of basic academic upgrading had been processed in conjunction with an assessment on the WAIS during that specified period. Our original population does not, therefore, represent the total number of persons who were trained under the auspices

of the Division but rather those who were being considered for academic training prior to acceptance into professional, business or technical training programs. Since the data for this study was collected during September of 1970, only those applicants who had been tested prior to the beginning of the Spring semester in February of 1970 were included.

The Sample

The sample which forms the basis of this study is, in practice, the total number of adults who actually enrolled in classes after being accepted as candidates for academic upgrading by counsellors and administrators in the Division of Vocational Education. It was found, on analysis, that out of the original population of 301, 23 were programmed directly into non-academic training courses, 108 were found to be ineligible for training or were referred to another agency for consideration, 170 became active candidates for academic upgrading and, hence, form the research sample for this present study. Some statistics describing the sample in relation to the original population are listed Table 1.

As can be seen in Table 1, the research sample shows some external evidence of having been pre-selected on the basis of general intelligence as well as on the basis of need for further education. The mean I.Q. rating of the sample is approximately five points above the mean I.Q. for those who were not accepted for academic training under the Division of Vocational Education. It may be noted further, that the mean I.Q. rating of the unaccepted portion of the original research population was the same as that found among trainees in the Edmonton area generally i.e. 103.34 (Souch, Romaniuk, & Field, 1969).

TABLE 1

COMPARING THE RESEARCH SAMPLE WITH THE ORIGINAL

POPULATION OF APPLICANTS FOR TRAINING

GROUPS	N	MEAN FULL SCALE I.Q.
Original population of applicants for academic upgrading	301	105.9
The research sample	170	108.2
Adults not accepted	131	103.6

Definition of Success in Adult Training

Success for an individual candidate, who actually enrolled in academic courses, was defined for the purposes of this study as:

a) Attendance. The adult trainee must have been in attendance at a selected academic institution until the end of a specified period. In this study attendance was required for a minimum period of one semester (five months) before the candidates was considered to be successful. In many cases within the research sample adult students had successfully completed one semester of training and were still in school at the time data was collected, thereby having proven themselves to be capable of success.

b) Grades Obtained. In order to be considered successful an adult trainee in this study was required to earn grades of 50% or over in two out of three subjects attempted during the first semester of his return to school.

Grouping of Trainees for Study Within the Sample

1) Successful Trainees. In order to study the relationship between 27 variables and various degrees of success, all adult trainees who had succeeded in completing one semester or more were grouped in the following ways:

a) Successful Male Trainees (one semester). A total of 17 males in the sample of trainees were found to have completed only one semester of training under the sponsorship of the Division of Vocational Education. Since the usual duration of a basic upgrading program is at least two semesters, it was decided that this group should be given a separate identity and treated as being different in general character from the other successful males in the sample.

b) Successful Female Trainees (one semester). There were 18 female adult trainees who were found to be successful in one semester but who did not go further under the auspices of the Division of Vocational Education. These 18 females were identified as a separate group and treated differently from the other successful females in the sample. The females in this category were found to be decidedly different in intellectual characteristics from the rest of the females in the sample.

c) Successful Male Trainees (SMT). All males in the sample who had continued on beyond one semester of successful training were grouped under this heading. A total of 43 males were, therefore, identified as successful male trainees. Of the 43 so identified, 29 were still in training at the time of this investigation. The remaining 14 male trainees had already completed two or more semesters successfully.

d) Successful Female Trainees (SFT). A total of 45 females from the sample were found to have continued on in training after completing one semester successfully. 28 of these successful females were still in training at the time of this study and 17 had completed two semesters of more.

2) Unsuccessful Trainees. For the purposes of this study any adult trainee who had failed to complete one semester of training, for any reason other than extended illness, was considered to be unsuccessful. Unsuccessful males were treated separately from unsuccessful females under the following categories:

a) Unsuccessful Male Trainees (UMT). This group of 32 consisted of those males who were accepted as candidates for academic upgrading, who had actually enrolled in and attended some classes, but who failed to complete one semester (five months) of academic training. Reasons for failure to complete a semester were not always stated. However, it was recorded that some of these simply ceased to attend while other considered themselves to be failing and therefore decided to withdraw. Wherever it was known that serious illness was responsible for the student's withdrawal from classes, that subject was removed from the unsuccessful group and from the sample.

b) Unsuccessful Female Trainees (UFT). Females who were actually engaged in training but who did not complete one semester were considered to be unsuccessful on the same basis as their male counterparts. There were, altogether, 15 females in the unsuccessful female Trainee group.

The Research Instrument

The Wechsler Adult Intelligence Scale (WAIS) is the most widely used, individually-administered, measure of adult intelligence presently available (Guertin,1959). Building on experience gained by the users of the Revised Stanford-Binet Intelligence Scale and the Wechsler-Bellevue Intelligence Scale, Wechsler (1955) devised eleven subtests which are used to rate the individual on a variety of behaviors. The rationale on which each subtest is based has been described by Wechsler (1958) and further elaborated by Rapaport, Gill & Schafer (1968). Factor analysis of the WAIS (Cohen,1957) has shown that the eleven subtests all measure a general intelligence factor in varying degrees. In addition, subtests can be grouped according to their ability to measure Verbal Comprehension, Perceptual Organization and Memory. Two subtests, the Picture Completion subtest and the Digit Symbol subtest measure something which is specific to each test respectively.

The total scale was standardized on a sample of 1700 adults selected by means of a stratified sampling procedure related to the proportion of persons in various age, occupational and ethnic groups as determined by the United States Census of 1950 (Wechsler,1955). The sample included seven different age levels, thirteen occupational categories, five levels of educational achievement and other geographical and racial groupings.

When using the WAIS, scaled scores are obtained by comparing the individual adult's raw score with a reference group of five hundered subjects from the standardization sample (Wechsler,1955). Scaled scores

are, therefore, the individual's standing in relation to the age group between 20 and 24 which was found to be the highest scoring group in the total standardization sample. Verbal I.Q., Performance I.Q. and Full Scale I.Q. are obtained by totalling the scaled subtest scores and comparing the total with the norm for the relevant age group.

Since 1958, counsellors in the Division of Vocational Education at Edmonton have employed the WAIS during the process of selecting candidates for adult training. The test appears to have been chosen primarily as a means of assessing the intellectual capacity of applicants whose educational goals required them to have a certain minimum of intellectual ability. However, because the test samples a fairly wide range of learning-related behaviors, it was also chosen as a potentially useful means of predicting success in the basic academic upgrading program sponsored by the Division. All of the test results used in this study were obtained, then, when the WAIS was administered to applicants for training before they were actually accepted as candidates. The results obtained from the WAIS have already been used as a means of streaming applicants into appropriate educational programs and as a means of predicting that they should be successful therein.

To a considerable degree, then, this present study is an evaluation of procedures which have been followed when using the WAIS as an aid to adult student selection procedures. It is, further, an exploration of some of the unused potential inherent in the WAIS. As a result, certain suggestions will be made as to how the instrument may be employed more effectively.

Data Collection Procedure

The sample, which forms the basis of this study, was taken from an original population of all the applicants to whom the WAIS was administered through the Division of Vocational Education between July 1968 and January 1970. The first stage in data collection was, therefore, to record the scaled scores on all subtests of the WAIS, the Verbal I.Q., the Performance I.Q. and the Full Scale I.Q. for the 301 subjects who constituted the original population. In the second stage of data collection, those applicants who had actually enrolled in academic courses were identified and separated from the population group. The third, and final, stage consisted of recording all of the demographic variables, which were available on each subject, from the files of the Division.

Data collection procedures resulted in a total of 25 independent variables becoming available for study in relation to the dependent variable of success. In addition, two other independent variables were generated, namely, the absolute difference between the Verbal I.Q. and the Performance I.Q. for each subject, and the directional difference between Verbal I.Q. and Performance I.Q. In all, 27 independent variables on a sample of 170 adult trainees were obtained.

Treatment of the Data

The six groups, consisting of successful and unsuccessful adult trainees from within the total sample, were submitted to analysis of variance procedures. The program ANOV 15, provided by the Division of Educational Research of the University of Alberta, Faculty of Education, was used in order to compare the successful and unsuccessful groups of

adult students in as many ways as possible. Since 20 of the 27 variables represented ordinal data it was possible to test for significant differences between the group means on those 20 variables all at the same time.

When using the ANOV 15 program, results are reported to the researcher in two ways. First, results are presented in a probability matrix for "Scheffe Multiple Comparison of Means." It is possible, therefore, to determine from an inspection of the matrix whether the probability of the difference between any two group means reaches the level of significance. Second, the results are reported according to the Newman-Keuls method in a "Comparison Between Ordered Means." This latter method of reporting results requires some further treatment before measures of significance can be established.

The Scheffe method of testing for significance is considered to be highly conservative (Winer, 1962, p. 89). In reporting the results from this analysis of data, therefore, all probabilities are reported according to the Scheffe method unless otherwise specified. In those comparisons where there appeared to be an approach to significance according to the probability matrix for Scheffe multiple comparison of means, the data was further tested according to the Newman-Keuls procedure. In some few cases it was found that the Newman-Keuls method of analysis indicated that the difference between group means reached the level of significance even though on the Scheffe matrix there had only been an approach to significance. In interpreting these results it should, however, be kept in mind that the Newman-Keuls procedure is also considered to be a rigorous test for significance even though not as conservative as the Scheffe procedure (Winer, 1962, p. 83).

Since seven of the variables in this study consisted of nominal data, the sample of 170 was regrouped on the basis of the descriptive information designated by each numeral. Groups, established according to such descriptive information, were then submitted to analysis of variance procedures in the same way as has been previously described except that the variable success-unsuccess was considered to be the independent rather than the dependent variable. For these variables, as well as for all others, the relationship between the dependent and independent variables is reported in terms of the degree of probability that was determined by the Scheffe method. In cases where the probability of variance between groups was below the 0.05 or the 0.01 level of significance the occurrence has been noted by asterisks. A trend toward significance was also noted in those cases where the probability of such variance occurring is found to be 0.10 or less.

CHAPTER IV

FINDINGS AND CONCLUSIONS

The results obtained from statistically analyzing the relation-
ships between 27 variables and success in adult academic upgrading, will
be presented under two main headings. The first group of variables con-
sists of data which is based on demographic information and which, as a
group, will be described as Demographic Variables. The second major
grouping of variables is distinguished by the fact that all data are
derived from measures of intellectual factors specifically as mea-
sured by the Wechsler Adult Intelligence Scale. In addition, there are
two variables in this second group which were generated by computing the
differences between Verbal I.Q. and Performance I.Q. scores. This
second group of variables will be considered under the heading of
Intellectual Variables.

In the interests of simplicity, the six groups involved in this
study will be designated in the tables by letters as follows: Successful
Male Trainees (one semester) will be SMT (1 sem.); Successful Female
Trainees (one semester) will be SFT (1 sem.); Successful Male Trainees
will be SMT: Successful Female Trainees will be SFT; Unsuccessful Male
Trainees and Unsuccessful Female Trainees will be UMT and UFT respectively.

Wherever probabilities are reported they are obtained from the
probability matrix for Scheffe multiple comparison of means. In those
cases where the Newman-Keuls procedure has been used to test for signifi-
cance it is so specified in the tables.

A. Demographic Variables

In this section the results obtained from the study of twelve
demographic factors in relation to success in adult training will be
presented. After describing the nature of each variable briefly, the
relevant statistical information will be presented in tabulated form.
On the basis of these findings a conclusion will be drawn concerning the
relationship of each demographic variable to success in adult training.
A summary of conclusions will be found at the end of this section.

1) Sex Differences in Relation to Success. The sex variable has been
dealt with in the design of this study. Groups of successful and un-
successful adult trainees have been further subdivided on the basis of
sex and throughout this study comparisons between male and female groups
are made consistently. The relationships between sex and success in
training will be reported as they occur in conjunction with other demo-
graphic and intellectual factors.

2) Age of Adult Trainees in Relation to Success. In order to determine
whether the age of adult trainees was a factor related to success in
academic upgrading, the following analysis was undertaken. First, the
variable was submitted to an analysis of variance procedure which made
comparisons between the mean age levels of the successful and unsuccess-
ful groups. Results of this first analysis are reported in Table 2.
Second, subjects were grouped into three subdivisions on the basis of
age and comparisons were made between the mean rates of success in the
groups. Findings from this second analysis are listed in Table 3. Ages
within the research sample ranged from 16 to 50 years with an over-all
mean age of 24.05 years.

TABLE 2

AGE IN RELATION TO SUCCESS

GROUPS	N	MEAN AGE	S	P
UMT	32	23.06	7.03	0.9176
SMT	43	25.21	7.52	
UFT	15	23.73	5.96	0.9972
SFT	45	24.29	9.07	
SMT (1 sem.)	17	23.00	5.38	0.9999
SFT (1 sem.)	18	23.72	7.89	

Note: In all tables asterisks will be used to denote that the probability of variance between groups has reached the level of significance. One asterisk (*) will be used consistently to indicate a probability below the 0.05 level of significance while two asterisks (**) will indicate a level of probability below the 0.01 level.

TABLE 3

AGE GROUPING IN RELATION TO SUCCESS

GROUPS	N	MEAN RATE OF SUCCESS*	S	P
16-19 yrs.	51	1.69	0.47	
20-29 yrs.	89	1.73	0.45	0.8564
20-29 yrs.	89	1.73	0.45	
30-50 yrs.	30	1.76	0.43	0.7405
16-19 yrs.	51	1.69	0.47	
30-50 yrs.	30	1.77	0.43	0.9296

*Mean rate of success was calculated on the basis of a rating of 1 for unsuccessful candidates and a rating of 2 for successful candidates.

Conclusion. The results of statistical analysis as reported in Tables 2 and 3 show that no relationship was found between age and success in adult training.

3) Marital Status. The relationship between marital status and success in academic upgrading was studied by establishing two categories. The first category consisted of all applicants for training who listed themselves as single at the time of application. The second category included all adult trainees who had entered into the relationship of marriage at some time prior to becoming candidates for upgrading. Among males in the sample it was found that only two out of a total of 32 who were

included in the second category had been divorced. Among the females, however, it was found that of those who had been married, only four were living with their husbands, seven were separted from their husbands when they applied for training, nineteen of the women were divorced and two were widowed.

The results obtained when the research groups were compared on the basis of the above categories are listed in Table 4.

Conclusion. It can be seen during an inspection of Table 4 that the difference in mean rate of success between groups did not actually reach the 0.05 level of significance in any of the comparisons which were made. There was, however, a strong trend in the direction of a higher success rate among married male trainees when they were compared with the unsuccessful male trainee group. This trend toward significance was slightly less pronounced when married trainees, were compared with un-married trainees without sex distinction. There was, however, no difference in the rate of success between married and unmarried female trainees. Hence, marital status was found to be a factor of considerable importance when considered in relation to success among male trainees but it had no bearing on success among the female trainees who were in this research sample.

4) Type of Residence Accomodation. The type of residence being provided by, or for, the trainee was treated as a variable by grouping the subjects on the following basis:

    a) Those living with families.

    b) Those who were maintaining a place of residence.

    c) Those who were paying for room and/or board.

TABLE 4

MARITAL STATUS IN RELATION TO MEAN RATE OF SUCCESS

GROUPS	N	MEAN RATE OF SUCCESS	S	P
Married males	27	1.70	0.43	0.0891
Unmarried males	48	1.50	0.51	
Married females	32	1.84	0.37	0.5067
Unmarried females	46	1.78	0.42	
Married M & F	65	1.78	0.41	0.1630
Unmarried M & F	105	1.68	0.47	

TABLE 5

RESIDENTIAL ACCOMMODATION IN RELATION TO SUCCESS

GROUPS	N	MEAN RATE OF SUCCESS	S	P
Living at home	29	1.76	0.43	0.2894
Maintaining res.	70	1.83	0.38	
Paying R & B	71	1.61	0.49	0.0120**
Maintaining res.	70	1.83	0.38	

Conclusion. It can be seen that the success rate is higher for
adult trainees who maintain their own places of residence than it is for
those who do not. In addition there is a trend in the direction of a
greater degree of success for those who maintain their own homes than
for those who live with parents or with families. It seems evident, then,
that the responsibility involved in the maintaining of a place of resi-
dence tends to support success among adult trainees of both sexes.

5) Number of Dependents. The relationship between the number of depen-
dents claimed by adults at the time of application for academic upgrading
and success in training was studied by means of this variable. The
results obtained from comparing the mean number of dependents found in
each group of successful and unsuccessful trainees are presented in
Table 6.

TABLE 6

NUMBER OF DEPENDENTS AND SUCCESS IN TRAINING

GROUPS	N	MEAN NUMBER OF DEPENDENTS	S	P
UMT	32	0.78	1.77	
SMT	43	1.51	1.99	0.3721
UFT	15	1.13	1.55	
SFT	45	1.11	1.57	1.0000
UFT plus UMT	47	0.89	1.69	
SFT plus SMT	88	1.31	1.79	0.1956
SMT (1 sem.)	17	0.82	1.24	
SFT (1 sem.)	18	1.11	1.13	0.9980

Conclusion. It can be seen from an inspection of Table 6 that successful trainees tended to support more dependents than unsuccessful trainees. When males who were successful were compared with their unsuccessful male counterparts the same trend in the direction of more responsibility for dependents was evident but with diminished strength. Thus, it can be concluded that, among male trainees, the fact of being responsible for dependents tends to be supportive of success in academic upgrading courses.

6) Employment Status Prior to Adult Training. In order to determine whether those adults who were employed at the time of entrance into training were more likely to succeed than others who were unemployed, an employment status variable was developed. This variable was studied in relation to success by establishing a simple dichotomy between those who were employed at the time when they applied for academic upgrading and those who listed themselves as unemployed. In many cases the records offered further detail in regard to the length and type of previous employment. However, since such information was not available for all subjects, the decision was made to record only the fact of employment and to study its relationship with success in adult training. Results of comparisons between successful and unsuccessful groups when rated on the employment variable are listed in Table 7.

Conclusion. The information in Table 7 reveals that the fact of being employed at the time of application for adult training neither increased nor decreased the likelihood of success among this particular sample of adult trainees.

TABLE 7

SUCCESSFUL ADULT TRAINEES AND MEAN RATE OF
PREVIOUSLY BEING EMPLOYED

GROUPS	N	MEAN RATE OF EMPLOYMENT*	S	P
UMT	32	1.69	0.47	0.9578
SMT	43	1.63	0.49	
UFT	15	1.87	0.35	0.8123
SFT	45	1.73	0.45	

*For this variable the numeral 1 was assigned to an employed applicant while the numeral 2 was assigned where the trainee was un-employed at the time of making application.

7) <u>Dependence on the Department of Social Development in Relation to Success in Adult Training</u>. With this variable those adults who were supported by the Department of Social Development at the time of application for training were compared with those who were self-supporting or supported by other than government agencies. Results are reported in Table 8 as comparisons between the proportion of each group found to be dependent on welfare at the time of entry into training.

TABLE 8

DEPARTMENT OF SOCIAL DEVELOPMENT SPONSORSHIP IN RELATION
TO SUCCESS IN ADULT TRAINING

GROUPS	N	MEAN SCORE OF GROUP ON S.D.S.*	S	P
UMT	32	1.84	0.37	0.9896
SMT	43	1.77	0.43	
UFT	15	1.27	0.46	0.8670
SFT	45	1.44	0.50	

*Social Development Sponsorship was assigned the numeral 1
whereas others were assigned the numeral 2.

Conclusion. Hence, it may be seen by examination of Table 8 that
there was no relationship found between sponsorship by the Department of
Social Development and success in academic upgrading for adults.

8) Grades Completed Prior to Entering Adult Training. In order to study
the relationship between previous levels of formal schooling and the
present level of success in academic upgrading courses, the mean number
of grades attained by each unsuccessful group was compared with the mean
number of grades completed by groups of successful adults. The results
obtained from these comparisons are shown in Table 9.

TABLE 9

GRADES PREVIOUSLY COMPLETED IN RELATION TO SUCCESS

GROUPS	N	MEAN GRADE LEVEL	S	P
UMT	32	9.9	1.2	0.9715
SMT	43	9.6	1.5	
UFT	15	8.5	1.2	Newman-Keuls $p < 0.01$**
SFT	45	9.5	1.2	
UMT	32	9.9	1.2	0.0759
UFT	15	8.5	1.2	

*Newman-Keuls comparison of UFT and SFT
  Multipler is 0.24698 and critical value is 3.64

Conclusion. An examination of Table 9 reveals that the unsuccessful female trainee group had the least previous formal education of any of the six groups in the sample. When compared with the successful females, the number of grades obtained by the unsuccessful women prior to returning to the classroom was found to be significantly lower (at the 0.01 level) than it was for their successful counterparts. Moreover it can also be seen in this table that the difference between unsuccessful females and unsuccessful males approached significance. Unsuccessful males had obtained considerably more education than unsuccessful females prior to returning to school. It may be concluded, tentatively, then, that the fact of having dropped out of school relatively early in life

proved to be more of a detriment to later successful retraining for the female trainees that it was for the males in this sample.

9) Number of Years Away From the Classroom. The possibility that the number of years between initial school leaving and the return to formal education may be related to success among adult trainees is examined through this variable. Results obtained from comparing the mean number of years away from school with success are presented in Table 10.

TABLE 10

YEARS OUT OF SCHOOL IN RELATION TO RATE OF SUCCESS

GROUPS	N	MEAN YEARS OUT OF CLASS	S	P
UMT	32	5.56	6.48	0.8939
SMT	43	7.86	8.21	
UFT	15	6.33	5.62	0.9917
SFT	45	7.06	8.64	
SMT (1 sem.)	17	5.53	5.47	0.9901
SFT (1 sem.)	18	7.44	8.64	

Conclusion. Results in Table 10 show that there was no discernible difference in the mean number of years away from school in any of the comparisons between successful and unsuccessful trainee groups.

10) <u>Training Goal in Relation to Success</u>. In order to determine whether
the educational objective specified by the applicant at the time of his
acceptance into training had a relationship with success in academic
upgrading, the sample was divided into groups on the basis of categories
of training goal. The subdivisions to which the subjects were assigned
were:

      a) Uncertain as to goal.

      b) Business Education (included Clerk-Typist, Secretarial Science,
or Business Administration at N.A.I.T.).

      c) Technical Training (included apprenticeship programs as well
as training in all skilled trades.

      d) Social Services (included Certified Nursing Aide and Social
Services Technology at N.A.I.T.).

      e) University Education (included Medical Laboratory and
Inhalation Therapy, X-Ray Technology and Nursing).

The results of comparisons which were made between groups of
adult trainees assigned to the foregoing categories in relation to the
mean rate of success are given in Table 11.

<u>Conclusion</u>. In Table 11 the success rate for adult trainees is
revealed to be no different for those adults with higher academic goals
than it was for those whose aspirations were less demanding academically.
The rate of success, then, was found to be unrelated to the type of
educational goals that were chosen by candidates, in consultation with
counsellors at the time of application for adult training.

TABLE 11

STATED TRAINING GOAL IN RELATION TO MEAN RATE OF SUCCESS

GROUPS	N	MEAN RATE OF SUCCESS	S	P
Uncertain as to goal	15	1.73	0.46	0.9993
Business Education	35	1.77	0.42	
Technical training	38	1.66	0.48	1.000
Social Services	23	1.65	0.49	
Uncertain as to goal	15	1.73	0.46	0.9997
University entrance	59	1.76	0.45	

11) <u>Handicap or Disability in Relation to Success in Adult Training Programs</u>. The terms of reference under which counsellors in the Division of Vocational Education operated when choosing the adult trainees observed in this study, required that applicants for training present evidence of being at a disadvantage when compared to others in society generally. In order to investigate the relationship between particular forms of disability and success in adult training the sample was grouped on the basis of the following categories:

a) Minor physical disability (i.e. a physical limitation which required the trainee to undertake retraining but which did not require the use of special equipment such as a wheel chair or crutches).

b) Major physical or psychological disability (i.e. being confined to a wheel chair or crutches or having had serious psychological difficulty requiring hospitalization).

c) Disadvantage due to the system. In this category were included all adult trainees who became eligible for training under the Division of Vocational Education programs because they were unacceptable for training by other government agencies. This category included those who were otherwise considered to be too old or too young for training, those who had not been in the labor force long enough to be considered eligible for training by Canada Manpower and those who were being rehabilitated after social aberrations such as incarceration, unmarried motherhood and similar deviations from the social norm. Further, this group included all those who were ineligible for training under Federal government training programs because they desired to proceed toward a University degree.

Table 12 shows the results when groups, selected according to the above categories of disability, were studied in relation to success in adult training.

Conclusion. Inspection of Table 12 indicates that there was no relationship found between the categories of disability, as established, and the mean rate of success.

TABLE 12

TYPE OF DISABILITY IN RELATION TO SUCCESS

GROUPS	N	MEAN RATE OF SUCCESS	S	P
Minor physical disability	23	1.78	0.42	
Major physical-psychological	32	1.71	0.46	0.8744
Major physical-psychological	32	1.71	0.46	
Disadvantaged due to system	115	1.71	0.45	0.9980

Summary of Results and Conclusions on Demographic Variables. On the one hand, male and female trainees in the research sample were found to be essentially alike in many demographic ways. Males, as a group, were no more frequently employed than were females before returning to school. Females supported as many dependents as males and maintained a place of residence for themselves and their dependents as often as males.

On the other hand, some notable differences between male and female adult students were found during this study of demographic variables. Females, in the research sample, differed greatly from males in terms of marital status. Whereas males listed themselves as either single or married, the vast majority of the females were single or separated from their husbands or divorced. In the matter of financial support, females as a group were found to be much more frequently dependent on Social assistance than the males. Many males were unable to specify

the source of their financial income at the time of application for training.

Since those demographic variables which have been found to be related to success operate somewhat differently for males than they do for females this summary of conclusions will treat men and women trainees separately.

Male Trainees. There would appear to be a common responsibility factor which is being measured to some degree by each of the three demographic variables which were found to be related to success among male trainees. The strongest measure of a relationship to success came from the analysis of the type of residence variable. In this examination there was an indication that men who were maintaining a residence succeeded much more frequently than males who were paying board and room. Although the trend did not reach significance it was also evident that males succeeded more frequently when maintaining a residence than when living at home with parents or family.

Also related to the responsibility factor were the trends which indicated that successful males are more often married than their unsuccessful male counterparts and successful males tend to be responsible for more dependents on the average (1.99) than males who do not complete the first semester. It may be concluded, for the purpose of drawing a contrast, that successful males are, typically, married, maintaining a residence and supporting 1.99 dependents whereas unsuccessful males typically are not married are living away from home and are supporting fewer than one (0.78) dependents.

<u>Female Trainees</u>. A responsibility factor and an educational experience factor appear to be involved in the two demographic variables which have been found to be particularly related with success among female trainees. First women trainees who completed the first stage of academic upgrading were similar to males in that those who maintained a place of residence stayed with the training program much more frequently than those females who paid board and room. They also remained in training more frequently than those who lived at home. In the two other areas where responsibility appears to be involved, namely in marital status and the support of dependents, the women who succeeded were not found to be different from those who did not complete the first semester.

Second, the successful females were found to be quite different from those females who dropped out of school during the first semester when the level of previous academic education was considered. Those women who left the program were found to have, as a group, less than nine grades of schooling prior to making application for retraining. In contrast the successful females had completed Junior High School and some High School work before returning to the classroom.

The typical successful female trainee, then, was different from her unsuccessful female counterpart mainly in the fact that she was maintaining a residence for herself and that she had completed Junior High School before applying for further education. It may be concluded, that the responsibility factor is an important predictor of female success in adult training even though it is based on fewer measures of variation than it is for males. Further it can also be inferred from the study

of previous grade levels achieved that the woman who has not completed Junior High School has less likelihood of success in the kind of academic upgrading that was being offered to the students in this sample than the woman who has the qualifications to enter high school.

B. Intellectual Variables

In this section results obtained through analysis of variance studies on the relationship between scores earned on the WAIS and success in adult academic training will be reported. Since the WAIS consists of eleven subtests the ratings from each of these smaller tests will be considered as a separate variable. In addition the three aggregate scores, Verbal I.Q., Performance I.Q. and Full Scale I.Q. and the two variables which were generated from them will be dealt with in this part of the report.

WAIS subtests lend themselves to being grouped according to the type of response which is required of the individual being tested. Accordingly, the first group of six will be reported under the title of Verbal Subtests while the second group will be treated under the heading of Performance Subtests. Brief conclusions will be drawn in connection with the report on each variable and a summary of results given at the end of each subsection.

Verbal Subtests

1) Information. The information subtest of the WAIS is considered to be an index of two aspects of the individual adult's intellectual function- ing. On the one hand, it is a measure of the level of alertness and awareness which was characteristic of the person during the period of his

development when he was exposed to a fund of information which is common to the vast majority of young people who grow up in North American culture (Rapaport, Gill, and Schafer, 1968).

On the other hand, the Information subtest is also sensitive to the level of richness or poverty which was inherent in the social, cultural and educational milieu surrounding the adult during his years of development. Scores on this particular subtest, then, represent an individual's relationship to a common fund of information at the time when he is being tested (Wechsler, 1958).

Results obtained from an analysis of the relationships between Information subtest scores and success in adult training are presented in Table 13.

Conclusion. Table 13 shows that the Information subtest discriminated effectively between females who were unsuccessful in academic upgrading and those women who were successful in one semester or more. It did not, however, distinguish between successful and unsuccessful male trainees in the research sample. It may be concluded then, that females who fail to obtain at least an average score (i.e. approximately 10) on the Information subtest of the WAIS are considerably more likely to drop out of academic training than those who score average or better.

TABLE 13

INFORMATION SUBTEST SCORES IN RELATION TO SUCCESS

GROUPS	N	MEAN	S	P
UMT	32	11.53	2.09	1.000
SMT	43	11.56	2.30	
UFT	15	8.53	2.64	Newman-Keuls
SFT	45	9.91	1.81	p < 0.05*
UFT	15	8.53	2.64	Newman-Keuls
SFT (1 sem.)	18	10.83	2.48	p < 0.01**
SMT (1 sem.)	17	11.76	1.48	0.8903
SFT (1 sem.)	18	10.83	2.48	
SMT	43	11.56	2.30	0.0060**
SFT	45	9.91	1.81	

*Newman-Keuls procedure comparing UFT and SFT
  Multiplier is 0.40519, critical value is 2.77.

*Newman-Keuls procedure comparing UFT and SFT (1 sem.)
  Multiplier is 0.44014, critical value is 4.12.

Table 13 further reveals that the larger group of successful female trainees was found to be significantly below all groups of male trainees when scored on the Information subtest. When undertaking to predict success, therefore, it would seem that a female applicant could score

somewhat less (approximately 2 points) on the Information subtest than her male counterpart and still be acceptable as a candidate who is likely to succeed in adult training.

2) Comprehension. The Comprehension subtest of the WAIS appears to be a measure of the individual's ability to make practical judgments. In responding to the tasks presented to him the testee is required to draw on his fund of information and experience, to consider alternative responses to a problem situation and finally verbalize his chosen solution. The intellectual factor measured by this subtest, in addition to general intelligence, has been found to be verbal comprehension (Cohen, 1957, p. 435). Scores on this subtest represent a level of intellectual functioning more than a type of learned skill (Rapaport et al., 1968, p. 93). Results obtained when mean scores on the Comprehension subtest were compared on the basis of success are shown in Table 14.

Conclusion. In Table 14 it can be seen that the scores on this measure of practical reasoning were well above the average for the population as a whole except in the case of the unsuccessful female trainee group. In consequence, the unsuccessful trainee group, who earned average scores on the Comprehension subtest, were found to be signifi-cantly weaker, when measured on this particular variable, than all other groups in the research sample. It may be concluded, therefore, that a candidate for academic upgrading at the adult level should have an above average score on this measure of practical judgment in order to be considered as one who is likely to succeed.

TABLE 14

COMPREHENSION SUBTEST SCORES IN RELATION TO SUCCESS

GROUPS	N	MEAN	S	P
UMT	32	13.41	3.06	0.9852
SMT	43	13.09	3.42	
UFT	15	10.60	3.72	Newman-Keuls $p < 0.05$[*]
SFT	45	13.18	3.69	
UFT	15	10.60	3.72	Newman-Keuls $p < 0.01$[*]
SFT (1 sem.)	18	14.06	2.99	

[*]Newman-Keuls procedure comparing UFT and SFT.
Multiplier is 0.65620, critical value is 3.31.

[*]Newman-Keuls procedure comparing UFT and SFT (1 sem.).
Multipler is 0.70029, critical value is 4.76.

3) <u>Arithmetic.</u> The Arithmetic subtest of the WAIS appears to be a
measure of the individual's ability to pay attention to orally presented
stimuli and to maintain concentration while using previously learned
mathematical operations (Rapaport et al., 1968, p. 118f). Factor analysis
indicates that, in addition to being a measure of general intelligence,
it also measures the memory factor to some extent (Cohen, 1957). Higher
scores on this subtest indicate an ability to perform two and three
stage mental abstractions without recourse to perceptual or tactual aids.
The relation of the Arithmetic subtest scores to success is presented in
Table 15.

TABLE 15

ARITHMETIC SCORES IN RELATION TO SUCCESS

GROUPS	N	MEAN	S	P
UMT	32	11.72	2.13	
SMT	43	11.58	2.76	0.9963
UFT	15	7.87	2.77	
SFT	45	9.91	2.19	0.0528*
UFT	15	7.87	2.77	
SFT (1 sem.)	18	10.89	1.94	0.0263**
UMT	32	11.72	2.13	
UFT	15	7.86	2.77	0.0000**
SMT (1 sem.)	17	11.82	2.40	
SFT (1 sem.)	18	10.89	1.94	0.0303*
SMT	43	11.58	2.76	
SFT	45	9.91	2.19	0.0190**

Conclusion. The outstanding feature to be noted in the results obtained from the Arithmetic subtest is that the mean score for the un-successful female group was exceptionally low. While successful female trainees, in both categories of success, scored significantly higher than the unsuccessful group, successful females were, in their turn,

significantly lower than males in all three categories. It can be con-
cluded, therefore, that while the Arithmetic subtest promises to be very
helpful in predicting success among female trainees, it would be unwise
to expect female applicants generally to score as well on this subtest
as males who are applying for training.

Within this particular somewhat pre-selected sample, the
Arithmetic subtest shows no. relationship with success among male trainees.
4) Similarities. The variable measured by the Similarities subtest of
the WAIS appears to be the individual's ability to relate certain pairs
of subjects on the basis of an abstract quality common to both. The
particular intellectual operation required in this subtest seems to be
a matter of considering all the ways in which two subjects are alike and
then proceeding to choose the one which most clearly identifies them as
belonging in the same abstract category (Rapaport et al., 1968, p. 99).
Generally, then the Similarities subtest can be described as a test of
abstract reasoning ability. The results obtained from comparing the
scores obtained on this subtest with success in adult training are
listed in Table 16.

Conclusion. The results presented in Table 16 indicate that there
is considerable strength in the Similarities subtest of the WAIS when
used for the purpose of discriminating between successful and unsuccess-
ful adult students. First, as can be seen in the table, the subtest was
found to be capable of distinquishing clearly between successful and un-
successful female trainees as they were found in the study sample. Second,
and more important, the Similarities subtest was found to be the only

Verbal subtest which had sufficient power to measure the difference between successful and unsuccessful adult trainees when they were compared on this variable without regard to the sex distinction. It may be concluded, therefore, that the Similarities subtest measures an aspect of intellect which is particularly relevant to success among adults who return to the academic classroom for further training.

TABLE 16

SIMILARITIES SUBTEST SCORES IN RELATION TO SUCCESS

GROUPS	N	MEAN	S	P
UMT	32	11.84	2.19	0.8874
SMT	43	12.35	2.70	
UFT	15	9.53	3.07	0.0266**
SFT	45	12.02	2.91	
UFT	15	9.53	3.07	Newman-Keuls
SFT (1 sem.)	18	12.28	2.29	p < 0.05
UMT PLUS UFT	47	11.10	2.69	0.0332**
SMT PLUS SFT	88	12.18	2.79	

*For the Newman-Keuls procedure comparing SFT (1 sem.) with UFT the multiplier is 0.54726 and the critical value is 3.86.

5) <u>Digit Span</u>. Scores on the Digit Span subtest are obtained when the individual being tested is able to attend to and receive numerical information aurally, retain the information briefly and repeat the numbers in both foreward and reverse order. The test is considered to be a relatively poor measure of general intelligence (Wechsler, 1958) and it appears to have only a limited value as a test of the memory factor in intellect (Cohen, 1957). Most examiners, therefore, consider that Digit Span is primarily an index of the level of anxiety which is present in the individual at the time of testing (Rapaport et al., 1968). Results of the analysis of Digit Span scores in relation to success are reported in Table 17.

<u>Conclusion</u>. Table 17 reveals that those candidates who were unsuccessful, when considered as group without regard for the sex difference, scored higher on the Digit Span subtest than successful males and females when grouped together. The same capacity to discriminate between successful and unsuccessful candidates is not seen, however, when successful and unsuccessful males are compared, although there is a trend toward higher scores among unsuccessful male trainees. When applied to the female trainees the Digit Span subtest showed no power to distinguish successful women from unsuccessful female students. Since there is a tendency toward an inverse relationship between scores on the Digit Span subtest and·success it may be concluded that the anxiety factor which appears to be related to this particular subtest is an unstable basis on which to base predictions of success or failure. If, therefore, certain subtests must be omitted in the course of assessing adults on the WAIS it would appear that

the Digit Span subtest could be dispensed with, without loss of power in the WAIS results.

TABLE 17

DIGIT SPAN SCORES IN RELATION TO SUCCESS

GROUPS	N	MEAN	S	P
UMT	32	11.47	2.63	0.3897
SMT	43	10.35	2.93	
UFT	15	10.60	2.23	0.9426
SFT	45	10.09	2.82	
SMT (1 sem.)	17	10.35	2.15	0.9764
SFT (1 sem.)	18	11.17	2.59	
UMT & UFT	47	11.19	2.52	0.0513*
SMT & SFT	88	10.22	2.86	

6) Vocabulary. As with the Information subtest, the Vocabulary subtest of the WAIS is considered to be partially a measure of an individual adult's ability to benefit from educational and cultural experiences. Consequently scores obtained on the Vocabulary subtest are often accepted as a fairly reliable indication of how well a person is likely to progress in academic endeavours. This particular subtest has also been found to be sensitive to the educational and cultural background from which the adult

has emerged (Wechsler, 1968) and is therefore frequently interpreted according to what is known of the individual's previous life history. When ratings on the Vocabulary subtest of the WAIS were studied in relation to success in adult training the information shown in Table 18 was obtained.

Conclusion. Contrary to expectations, the information presented in Table 18 does not show the Vocabulary subtest as an effective means of discriminating between successful and unsuccessful trainees in this fairly carefully pre-selected sample. The only discernible difference between groups, when compared on the Vocabulary variable, was found when unsuccessful males scored well above unsuccessful females. It is possible to conclude, then that the Vocabulary subtest appears to be involved with success up to a normal or average level of attainment. That is persons who score below the national average tend to be poor trainee risks. However, for persons who score at the average level (10) or above the predictive power of the Vocabulary subtest is sharply diminished.

TABLE 18

VOCABULARY SUBTEST SCORES IN RELATION TO SUCCESS

GROUPS	N	MEAN	S	P
UMT	32	12.00	2.52	0.9941
SMT	43	11.81	2.95	
UFT	15	9.66	2.84	0.5183
SFT	45	10.93	2.86	
SMT (1 sem.)	17	11.23	2.14	1.0000
SFT (1 sem.)	18	11.22	3.15	
UMT	32	12.00	2.52	Newman-Keuls
UFT	15	9.66	2.84	$p < 0.05$**
SMT	43	11.81	2.95	0.5428
SFT	45	10.93	2.86	

*Multiplier for Newman-Keuls procedure is 0.53262 and critical value is 3.63.

Verbal I.Q.

The Verbal I.Q. is considered here under the subheading of Verbal subtests since it is, in effect, an aggregate of verbal subtest scores. The actual Verbal I.Q. rating is obtained by comparing the sum of Verbal subtest scores with the norm for those persons in the general population who fall within the same general age group as the individual being tested.

When reporting on the relationship between Verbal I.Q. and success in adult training we are dealing with a variable which represents an aggregate capacity to perform verbally-oriented intellectual functions. The results obtained from studying the relationship between Verbal I.Q. and success are presented in Table 19.

Conclusion. As could be anticipated from observing the results on individual Verbal subtests, the Verbal I.Q. was found to be discriminating only when applied to the successful and unsuccessful groups of female trainees. It seems evident, then, that the Verbal I.Q. in common with several of the Verbal subtests tends to lose its predictive value when the general level of Verbal intelligence reaches the level of average (100) or above. It seems safe to conclude that an applicant for academic upgrading who scores below the national mean has much less chance of succeeding in the usual basic academic upgrading program than those who have a Verbal I.Q. equal to the average or above.

TABLE 19

VERBAL I.Q. IN RELATION TO SUCCESS IN ADULT TRAINING

GROUPS	N	MEAN	S	P
UMT	32	112.56	10.55	
SMT	43	111.32	11.84	0.9761
UFT	15	97.66	13.93	
SFT	45	107.55	11.26	0.0470*
SMT (1 sem.)	17	110.53	8.69	
SFT (1 sem.)	18	111.27	10.02	1.0000
UFT	15	97.66	13.93	
SFT (1 sem.)	18	111.27	10.02	0.0380*

Summary of Results and Conclusions

In order to clarify impressions which have been gained during
the consideration of individual variables, Verbal subtest profiles have
been charted for each of the groups involved. The out-
standing feature in the results so far has been the notable difference
between unsuccessful male trainees and unsuccessful female trainees
(Figure 1). It may be concluded, after an examination of the figure that
the intellectual factors contributing to failure in completing the first
semester of academic upgrading were different for the males than they were
for the females. Whereas the unsuccessful males as a group were potentially

very able in performing the mental functions that are generally considered
to be the basis of academic success, unsuccessful females in contrast
were potentially much less capable.
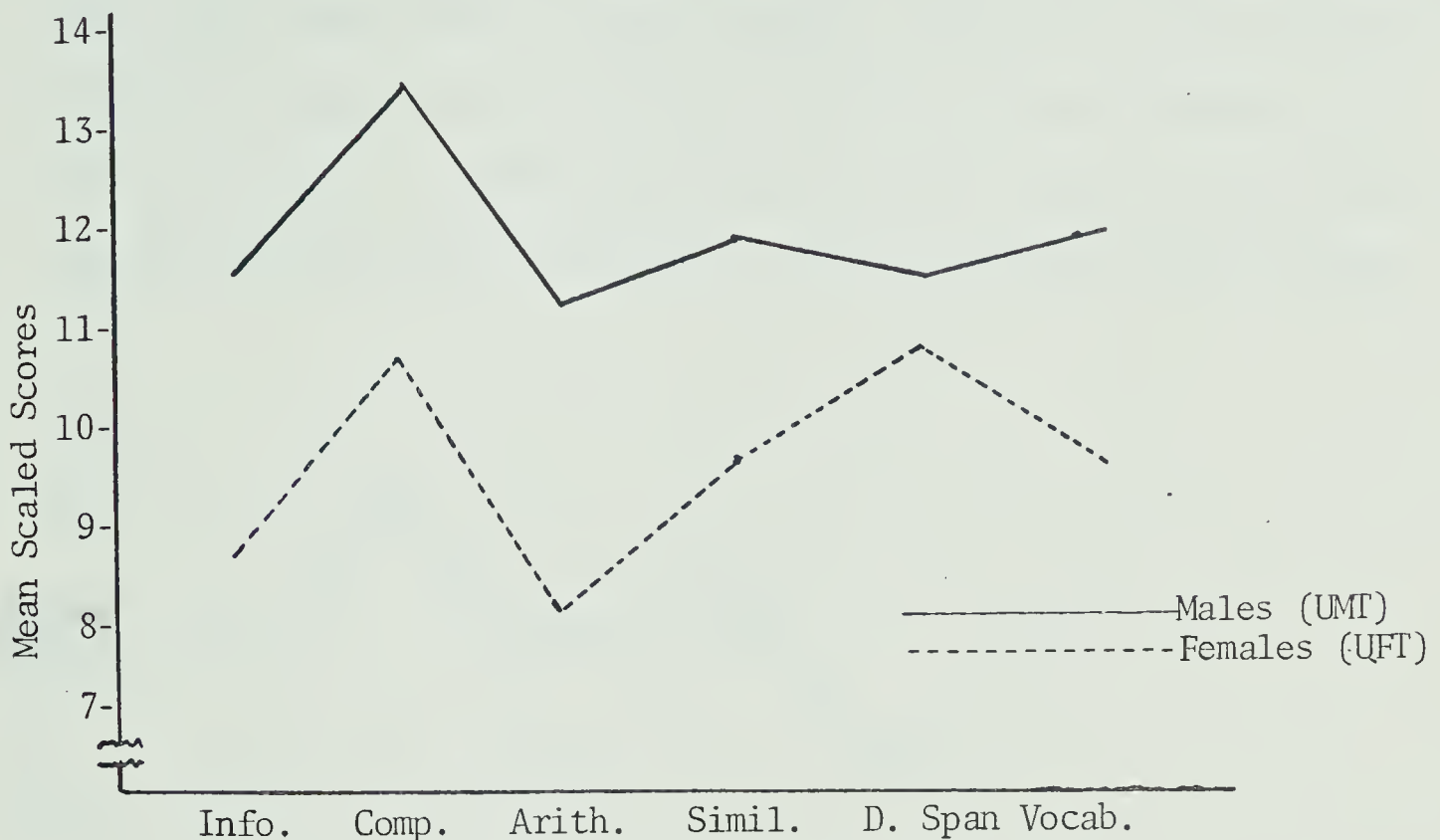
THE VERBAL SUBTEST OF THE WAIS

FIGURE 1

PROFILES OF THE VERBAL SUBTEST SCORES COMPARING
UNSUCCESSFUL MALE TRAINEES AND UNSUCCESSFUL
FEMALE TRAINEES

Another impression gained during the examination of individual
Verbal subtest results was that the successful females on the whole were
somewhat less able intellectually than the successful males in the study
sample. When the Verbal subtest profiles of men students who completed
more than the first semester are compared with their female counterparts,
however, it can be seen that the differences are actually only in the two

areas where subtests are influenced by educational and cultural background, namely, the Information and the Arithmetic subtests (Figure 2). In all of the other four areas measured by Verbal subtests the female success group was not found to be statistically different from the male success group even though there is some observable difference on the profile. The similarity rather than the difference between successful females and successful males is further emphasized when the group of women who completed one semester are considered. This one semester female success
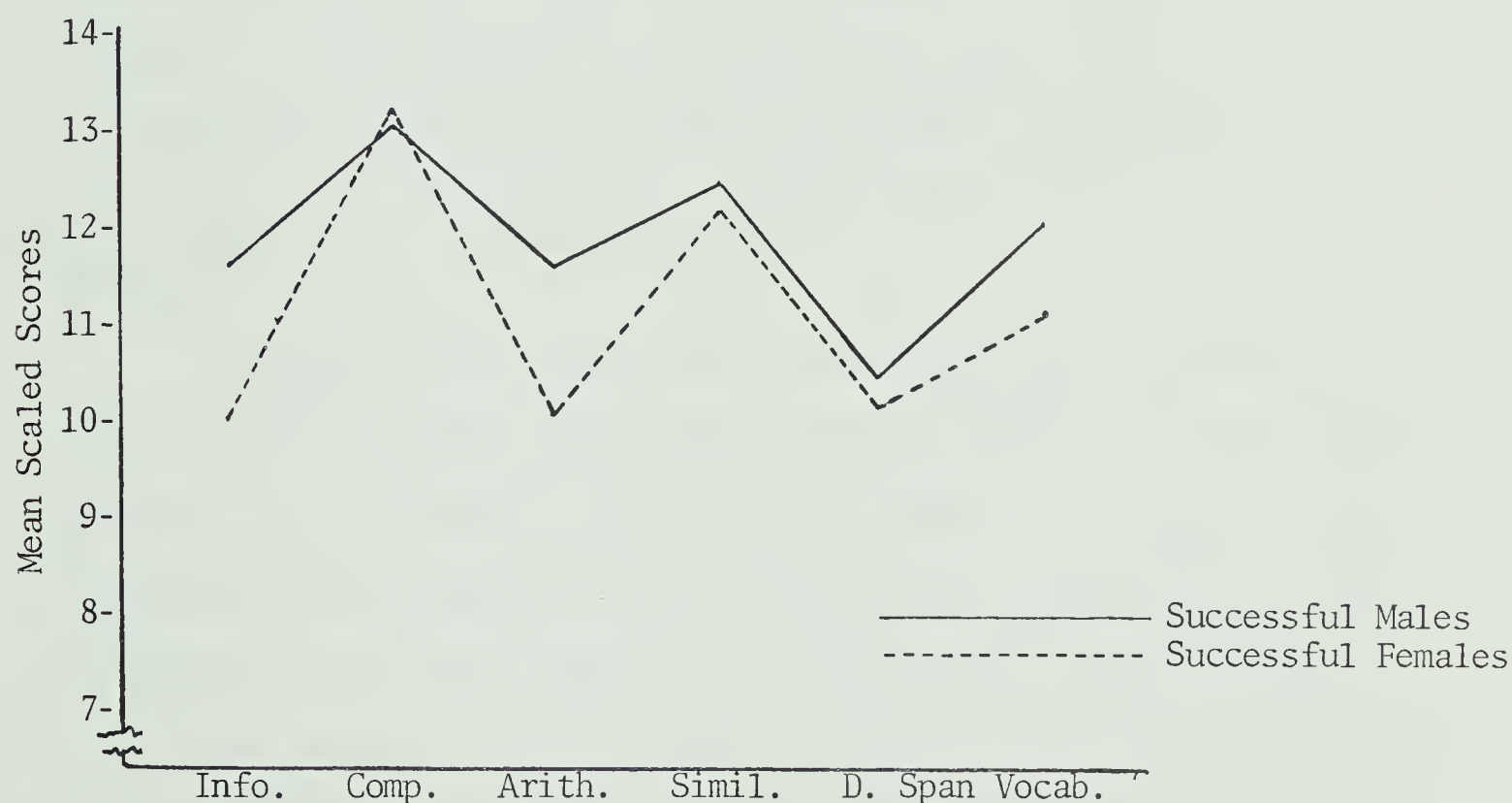
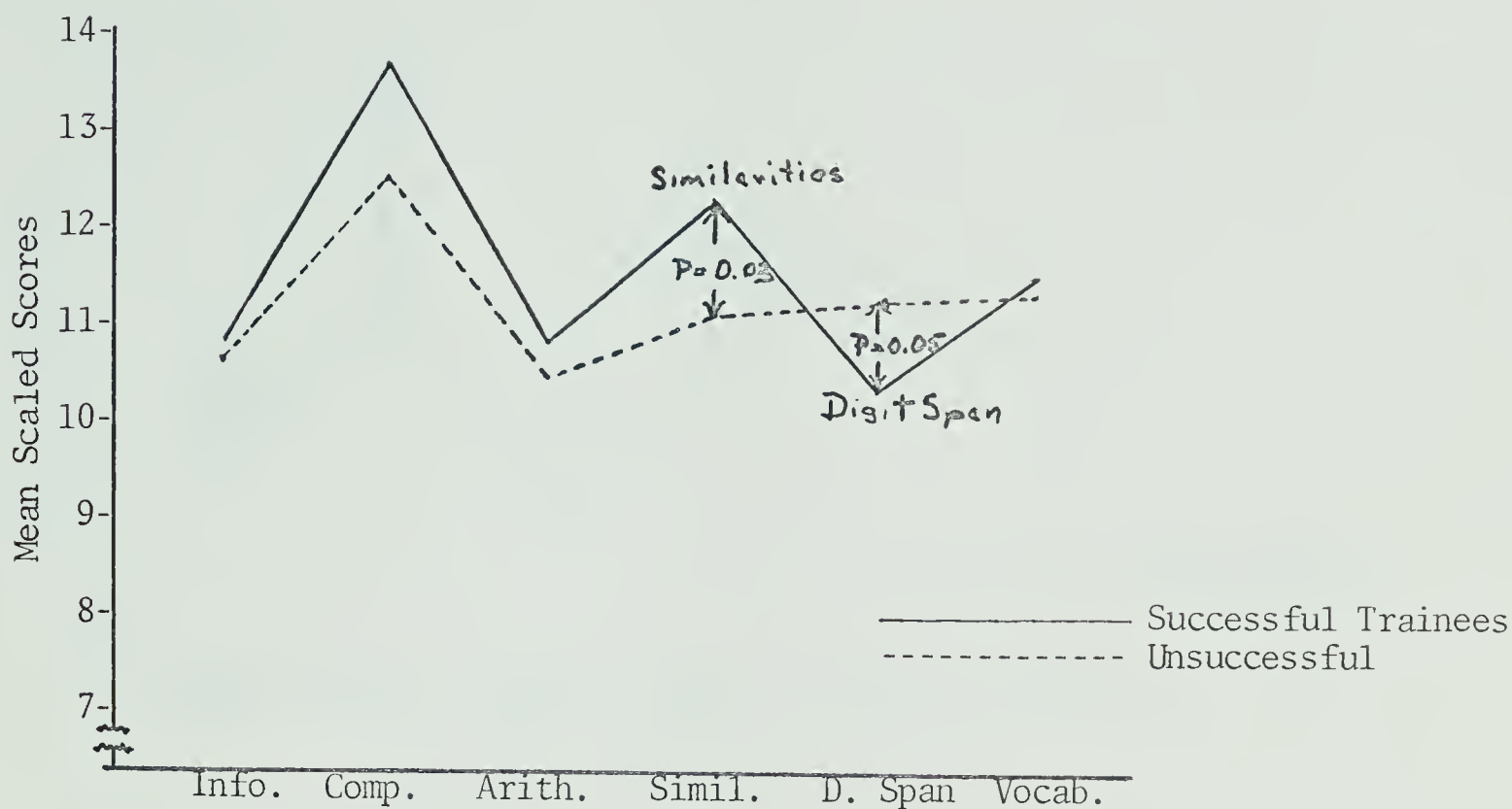THE VERBAL SUBTESTS OF THE WAIS

FIGURE 2

COMPARING SUCCESSFUL MALE TRAINEES WITH SUCCESSFUL
FEMALE TRAINEES ON THE VERBAL SUBTESTS

group was found to be equally strong in all variables of intellect which are measured by the Verbal subtests and therefore indistinguishable from males in terms of academic potential.

It may be concluded, then, from the foregoing inspection of successful trainee profiles that successful females were potentially as capable in verbally-oriented intellectual functions as were successful males. The difference between successful males and successful females appears only where there is a strong possibility that educational and cultural deficiencies could have been responsible for the lower female scores. It could further be conjectured that adult trainees are capable of overcoming limitations in learned information and learned mathematical skills when other verbal subtests indicate above average intellectual strength.

In Figure 3, where the Verbal subtest profiles of successful and unsuccessful students are compared without regard to the sex differential, it can be seen that there are indications of the power to discriminate in both the Similarities and the Digit Span subtests. Whereas the Similarities subtest appears to discriminate on a positive basis, i.e. higher scores on the Similiarities subtest would appear to indicate greater likelihood of success, the Digit Span scores were found to have a negative relation with success. For purposes of clarification, then, these two subtests will have to be considered separately.

THE VERBAL SUBTESTS OF THE WAIS

FIGURE 3

COMPARING SUCCESSFUL TRAINEES WITH UNSUCCESSFUL TRAINEES

Further examination of the results (Figure 4) reveals that the Similarities subtest was highly effective when discriminating between successful female trainees and those who did not complete one semester of upgrading. It may be noted at the same time that the Information, Comprehension and Arithmetic subtests were also found to distinguish unsuccessful females from successful ones although with somewhat less power.
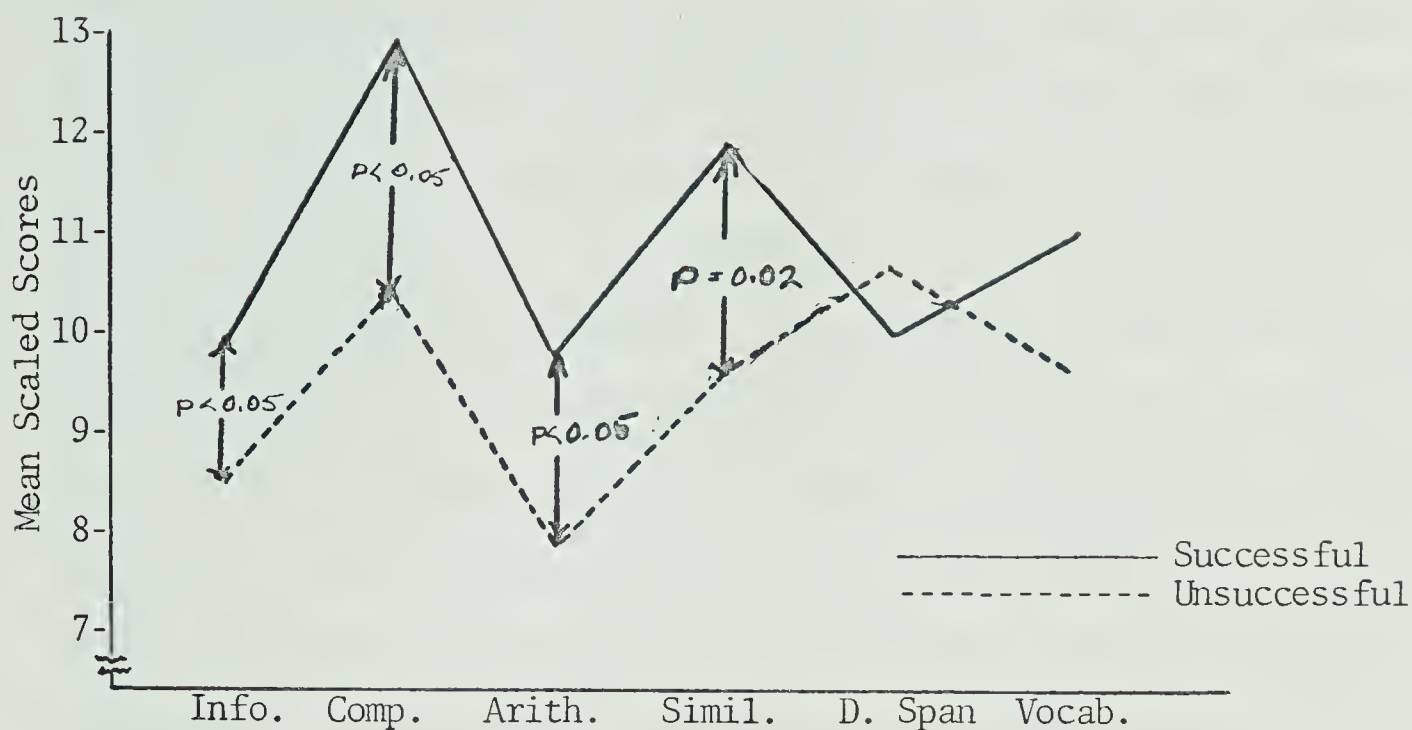
THE VERBAL SUBTESTS OF THE WAIS

FIGURE 4

COMPARING SUCCESSFUL AND UNSUCCESSFUL FEMALE TRAINEES
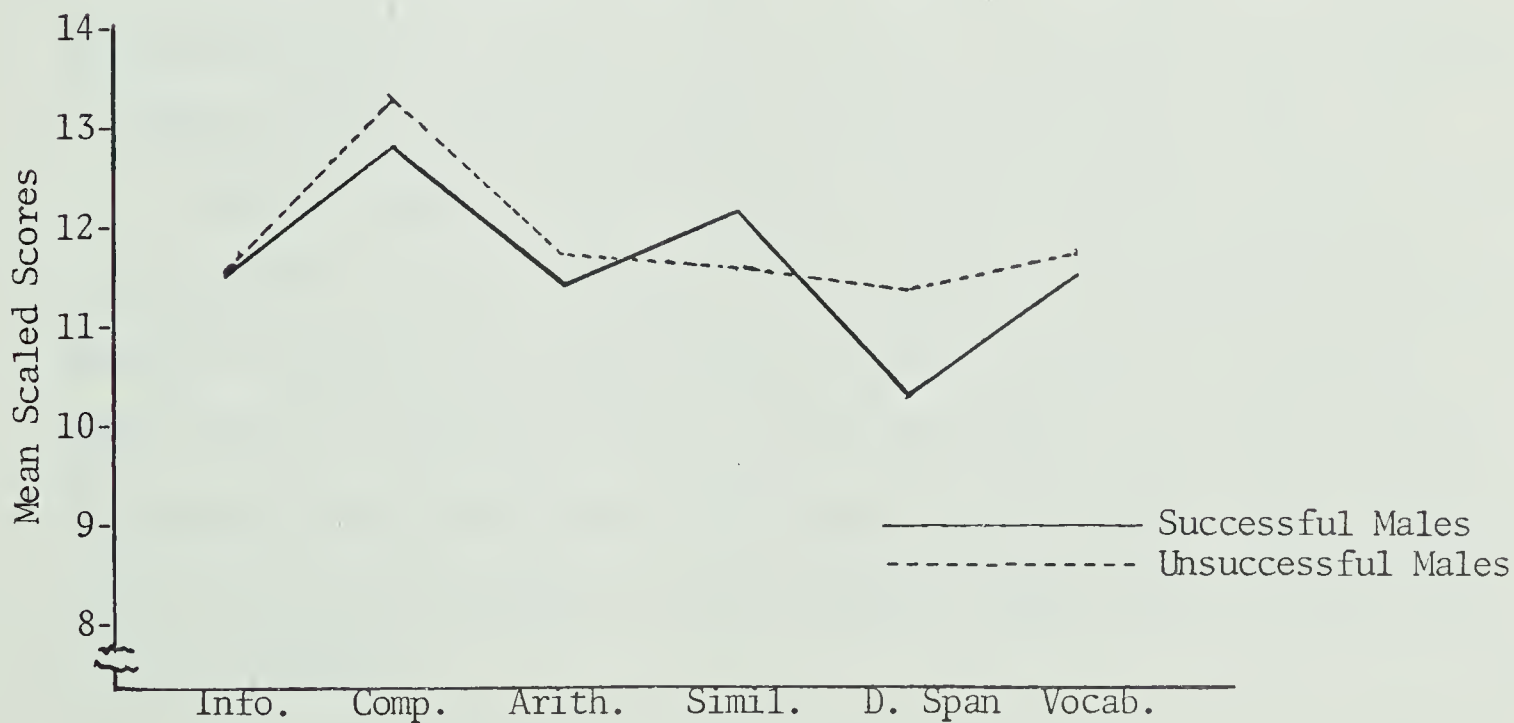
THE VERBAL SUBTESTS OF THE WAIS

FIGURE 5

COMPARING SUCCESSFUL AND UNSUCCESSFUL MALE TRAINEES

When consideration is given to the Verbal subtest profiles for males (Figure 5) it may be seen that the Similarities subtest stands alone among the six verbally oriented indexes of intelligence. It is the one test on which the mean score for unsuccessful males was lower than the mean score for their successful counterparts. The difference in mean Similarities subtest scores does not reach significance when successful and unsuccessful males are compared. There was, however, sufficient trend in the direction of lower Similarities scores for unsuccessful males that an actual difference was found when male and female success groups were combined and compared with unsuccessful males and females as a group (Figure 3).

In another analysis (p. 84; Figure 11) subjects in the median range of I.Q. level were removed from the sample. When related to the successful and unsuccessful trainees in the remaining high and low I.Q. group the Similarities subtest was found to be considerably more effective in discriminating between successful and unsuccessful males (p=0. 2).

Hence, taking all these findings on the Similarities subtest into account, it may be concluded that the subtest is potentially the most important predictor of success among the Verbal subtests of the WAIS. It shows promise of being particularly valid when applied to adult trainees at the upper and lower limits of the range of intellectual capacity which was found among the subjects of this research sample (e.g. F.S.I.Q. 108. 17; S.D. 10.85).

In the Verbal subtest profiles, which show a comparison between the mean scores of all successful trainees and the mean scores of all unsuccessful trainees, there appears to be a negative relationship between scores on the Digit Span subtest and success (Figure 3). On further examination, however, it can be seen that the Digit Span subtest had no power to distinguish between successful and unsuccessful female trainees (Figure 4). Moreover, when applied to male trainees there was only a slight trend to suggest that higher scores on the Digits Span subtest were related to failure among adult male trainees (Figure 5). Hence, it may be concluded that the power indicated by the profiles in Figure 3 does not continue to be evident when males and females are studied separately. The value of the Digit Span subtest appears, after all, to be negligible when considered as a predictor of success among adult trainees.

Performance Subtests

1) Digit Symbol. The Digit Symbol subtest is first of a group of WAIS rating scales which are considered to belong in the category of Performance, as distinguished from Verbal, subtests. In this particular subsection of the WAIS, the individual is rated according to his ability in transferring meaningless information quickly. The task presented to the individual requires visual perception of the stimuli and manual recording. Intellectual functions involved appear to be: immediate recall of recently received information, some learning of meaningless but associated material, and perhaps, the gaining of insight into how performance may be improved through experience (Rapaport et al., 1968, p. 156f). Factor analysis indicates that the Digit Symbol subtest is not a measure of perceptual

organization or memory but rather a measure of a factor which is specific to this particular subtest (Cohen, 1957). Results gained from analyzing Digit Symbol subtest scores in relation to success in adult training are reported in Table 20.

Conclusion. Thus, an examination of Table 20 reveals that no discernible relationship was found between scores on the Digit Symbol subtest and success among adult trainees in the research sample.

TABLE 20

DIGIT SYMBOL SUBTEST SCORES IN RELATION TO SUCCESS

GROUPS	N	MEAN	S	P
UMT	32	10.25	3.20	0.8458
SMT	43	9.81	2.33	
UFT	15	10.60	3.85	0.9869
SFT	45	10.29	2.53	
SMT (1 sem.)	17	11.06	2.41	1.0000
SFT (1 sem.)	18	11.17	2.28	

2) Picture Completion. In this particular subtest the individual is required to look at visually presented stimuli, form a gestalt and discriminate between relevant and irrelevant detail. In some instances a small amount of memory and reasoning may be required of the testee (Rapaport

et al., 1968) but in most situations the material presented is immediately
familiar to anyone raised in the North American culture. Scores on the
Picture Completion subtest represent the number of times the individual
has identified the most important part missing in each of a series of 21
pictures. Factorial analysis of the WAIS shows that the Picture Completion
subtest is the best single measure of general intelligence among the
performance-oriented subtests. In addition, this subtest measures a
factor which is specific only to itself and therefore not classifiable as
memory, verbal comprehension, or perceptual organization (Cohen, 1957).
Results obtained from comparing scaled scores on the Picture Completion
subtest with success are reported in Table 21.

Conclusion. In Table 21 it can be seen that the Picture Completion
subtest showed considerable strength when discriminating between success-
ful and unsuccessful adult trainees. Unsuccessful females were found to
score lower on the Picture Completion test than successful women students
whether they completed one semester or more than one semester. When applied
to the males the Picture Completion subtest effectively discriminated
between unsuccessful males and the men who completed one semester. It
did not, however, show the same power when examining the difference between
unsuccessful male trainees and those who were successful in more than one
semester. Thus it may be concluded that there is reason to pay considerable
attention to the scores on the Picture Completion subtest when dealing with
applicants for adult training whose general ability is above average.

TABLE 21

PICTURE COMPLETION SCORES IN RELATION TO SUCCESS

GROUPS	N	MEAN	S	P
UMT	32	10.75	1.61	0.8619
SMT	43	11.16	2.10	
UFT	15	9.00	2.88	Newman-Keuls p < 0.05[*]
SFT	45	10.24	1.94	
UMT PLUS UFT	47	10.19	2.22	0.1926
SMT PLUS SFT	88	10.69	2.06	
UMT	32	10.75	1.61	Newman-Keuls p < 0.05[*]
SMT (1 sem.)	17	12.65	2.47	
UFT	15	9.00	2.88	Newman-Keuls p < 0.05[*]
SFT (1 sem.)	18	10.94	2.18	

[*]For the Newman-Keuls Procedure:
  a) Comparing UFT and SFT, multiplier is 0.38731 and critical value is 2.77.
  b) Comparing UMT and SMT (1 sem.), multiplier is 0.43641 and critical value is 4.03.
  c) Comparing UFT and SFT (1 sem.), multiplier is 0.4361 and critical value is 3.63.

3) Block Design. The Block Design subtest of the WAIS is the purest
measure of perceptual organization in the complete scale (Cohen, 1957).
Considerable manual dexterity and visual acuity are also required for the
higher ratings on this particular subtest. Since the Block Design section
of the WAIS is also a fairly adequate measure of general intelligence, it
is generally agreed that the tasks involved require some reasoning power
and some flexibility of mental functioning (Wechsler,1958). Results on
the Block Design subtest in relation to success are reported in Table 22.

Conclusions. The information in Table 22 shows that the Block
Design subtest was capable of discriminating only when unsuccessful female
students were compared with the women who had completed one semester of
training. In comparing unsuccessful adult trainees, regardless of sex,
with all successful students there was a trend toward higher scores on the
Block Design subtest among the successful students. Since, however, there
was no other evidence of power to discriminate between the remaining male
and female groups, it may be concluded that the Block Design subtest has
a somewhat limited use when considered as a predictor of success among
adult trainees such as are found in this research sample.

TABLE 22

BLOCK DESIGN SUBTEST SCORES IN RELATION TO SUCCESS

GROUPS	N	MEAN	S	P
UMT	32	11.06	2.19	0.8875
SMT	43	11.51	2.26	
UFT	15	9.20	2.70	0.5326
SFT	45	10.26	2.58	
UFT	15	9.20	2.70	Newman-Keuls $p < 0.05$[*]
SFT (1 sem.)	18	11.39	2.79	
UMT	32	11.06	2.19	0.6399
SMT (1 sem.)	17	12.41	2.29	
UMT PLUS UFT	47	10.46	2.50	0.3687
SMT PLUS SFT	88	10.87	2.49	

[*]For the Newman-Keuls Procedure:
    Comparing UFT and SFT (1 sem.), multiplier is 0.05057 and
    critical value is 3.63.

4) <u>Picture Arrangement</u>. The Picture Arrangement subtest of the WAIS has
been interpreted as a measure of the individual adult's planning ability
(Rapaport et al., 1968 p. 125f) and an indication of his 'social intelli-
gence' (Wechsler, 1958). However, factorial analysis has found it to be an
'ambiguous measure' of factors which are common to other WAIS subtests

and a 'mediocre' measure of general intelligence (Cohen, 1957, p. 456).
Scores on the Picture Arrangement subtest do, however, reflect some
ability to see parts in relation to the whole and a certain amount of
manual dexterity. Results obtained from a study of scores on the Picture
Arrangement subtest in relation to success are recorded in Table 23.

Conclusion. Hence it can be seen during an examination of Table
23 that there was no measurable relationship between scores on the Picture
Arrangement subtest and success among the adult students in this study
sample.

TABLE 23

PICTURE ARRANGEMENT SUBTEST SCORES IN RELATION TO
SUCCESS

GROUPS	N	MEAN	S	P
UMT	32	10.59	2.87	0.9913
SMT	43	10.97	2.41	
UFT	15	9.66	2.22	0.5836
SFT	45	10.75	2.72	
SMT (1 sem.)	17	11.88	2.37	0.9458
SFT (1 sem.)	18	10.94	2.18	

5) Object Assembly. The particular intellectual factor measured by the Object Assembly subtest has been found to be perceptual organization (Cohen, 1957). It is generally agreed that the tasks which must be performed while doing this particular subtest of the WAIS, require the individual to exercise his ability to organize parts in relationship to a whole object, to gain insight into the nature of the finished product and then to move effectively toward putting the parts into the proper position. Results from the analysis of Object Assembly scores in relation to success in adult training are tabulated in Table 24.

Conclusion. The Object Assembly subtest, as can be seen in Table 24, was not found to discriminate between any of the successful and unsuccessful groups of students. It may be concluded, therefore, that it has little predictive value when applied to adult students with the intellectual capacity of those in the research sample.

TABLE 24

OBJECT ASSEMBLY SUBTEST SCORES AND SUCCESS

GROUPS	N	MEAN	S	P
UMT	32	10.84	3.11	0.9954
SMT	43	10.67	2.52	
UFT	15	9.8	2.57	0.9628
SFT	45	10.24	2.88	
SMT (1 sem.)	17	11.53	2.29	0.9958
SFT (1 sem.)	18	12.11	3.12	

Performance I.Q.

The Performance I.Q. is considered under the heading of Performance subtests because it represents an aggregate of the scores obtained on individual Performance subtests. Results obtained, when studying Performance I.Q. scores in relation to success are presented in Table 25.

TABLE 25

PERFORMANCE I.Q. SCORES IN RELATION TO SUCCESS

| GROUPS	N	MEAN	S	P
UMT	32	105.2	10.91	0.9995
SMT	43	105.5	10.45	
UFT	15	98.3	12.96	0.3993
SFT	45	103.9	10.57	
SMT (1 sem.)	17	112.2	10.44	0.9939
SFT (1 sem.)	18	109.7	11.35	
UFT	15	98.3	12.96	Newman-Keuls
SFT (1 sem.)	18	109.7	11.35	$p < 0.05$*

*For the Newman Keuls procedure:
Comparing UFT and SFT (1 sem.), multiplier to 2.06264
and critical value is 3.86.

Conclusion. It will be noted during an examination of Table 25 that the Performance I.Q. rating was discriminating only when applied to the highest scoring females (women who were successful in one semester) and the lowest scoring females (unsuccessful). Further there was some indication that unsuccessful females tended to rate lower than those who were successful at more than one semester of training. It may be concluded, then, that the Performance I.Q. rating has some predictive value up to the average level of performance, i.e. those scoring below the

average (100 or less) would appear to be poor risks as adult trainees. Among students whose Full Scale I.Q. rating is average and above, the Performance I.Q. in itself would appear to lose its predictive value.

Summary of Results and Conclusions

All successful trainees are compared with all unsuccessful trainees on a Performance subtest profile in Figure 6. It can be seen from this comparison that there is some indication of a relationship between success and higher scores on the Picture Completion, Block Design and Picture Arrangement subtests. Among these three Performance subtests, the Picture Completion shows the most promise of becoming a predictor of success.
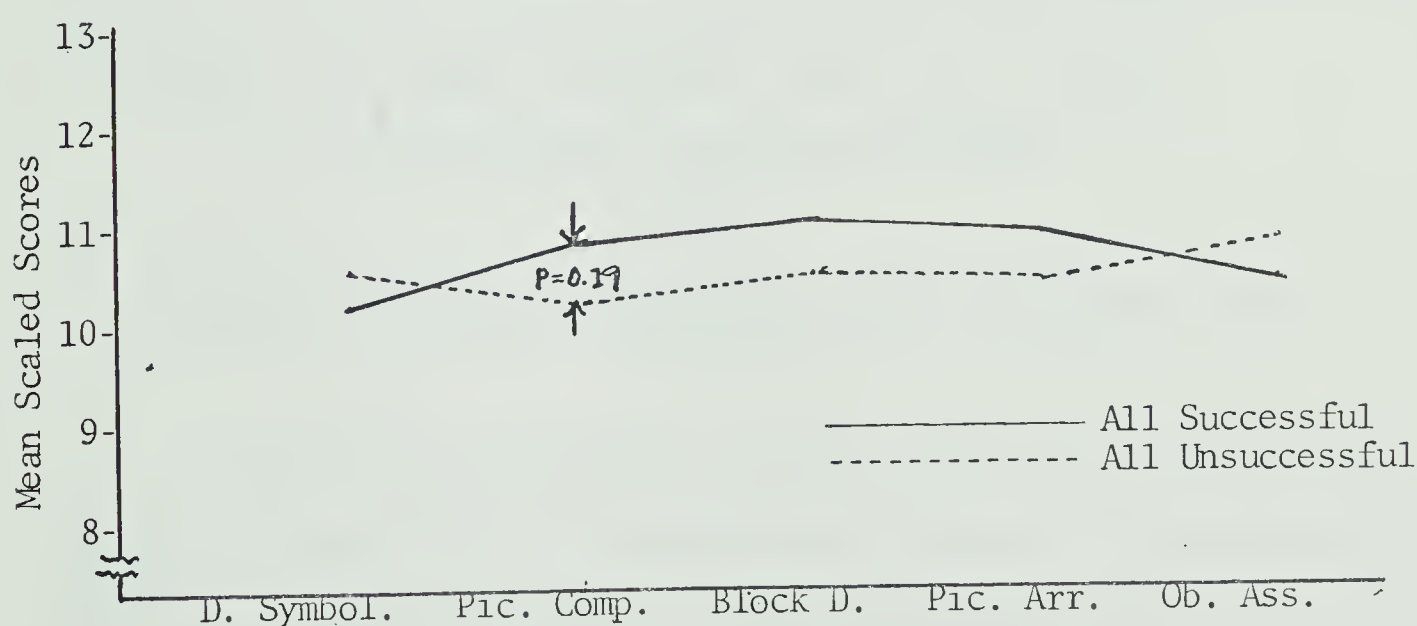
THE PERFORMANCE SUBTESTS OF THE WAIS

FIGURE 6

COMPARING ALL UNSUCCESSFUL TRAINEES WITH ALL SUCCESSFUL
TRAINEES

When Performance subtest scores for males only are compared (Figure 7), however, it can be seen that there was in fact no significant difference between successful and unsuccessful males when they were compared according to scores on the individual Performance subtests.
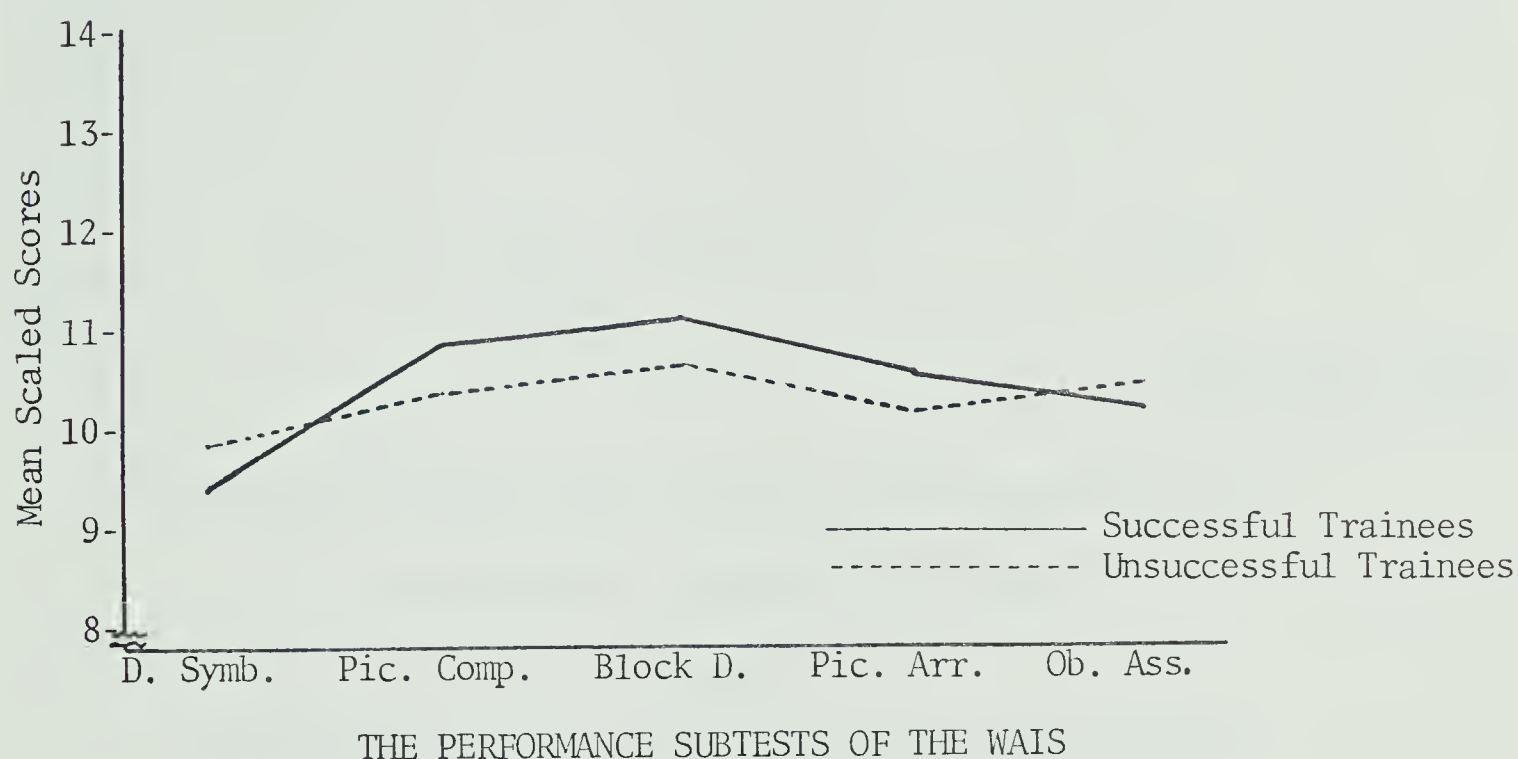

THE PERFORMANCE SUBTESTS OF THE WAIS

FIGURE 7

COMPARING SUCCESSFUL MALE TRAINEES WITH UNSUCCESSFUL MALE
TRAINEES

A comparison of Performance subtest profiles for females only (Figure 8) reveals that the trends shown in Figure 6 are almost entirely due to the differences which were found between successful and unsuccessful female trainees. Even so, it can be seen in Figure 8 that the unsuccessful females were not as different from successful females in their scores on Performance subtests as might be expected on the basis of their generally lower intellectual capacity. Unsuccessful females were actually

different from their successful counterparts only when scores on the

Picture Completion subtest were compared.
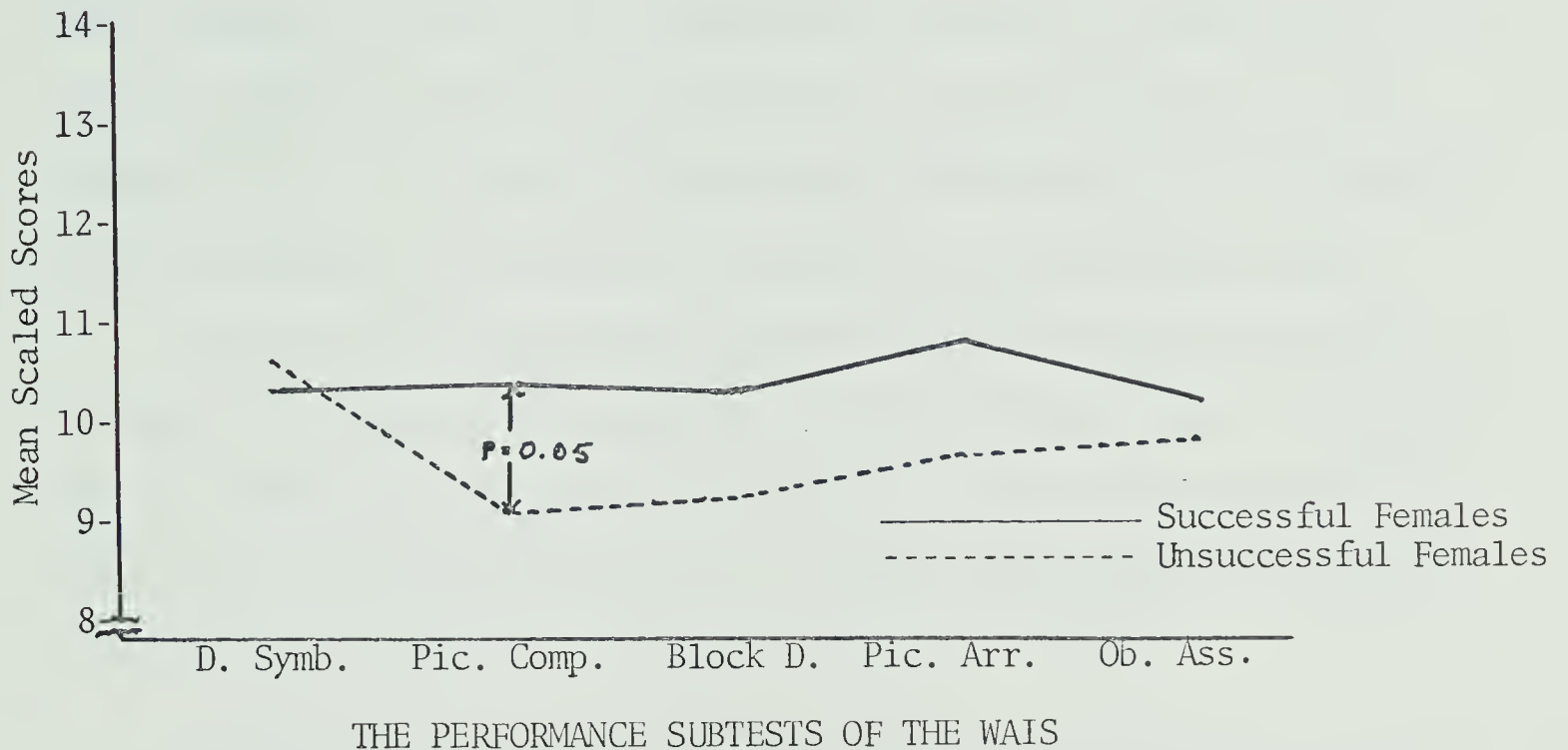

THE PERFORMANCE SUBTESTS OF THE WAIS

FIGURE 8

COMPARING SUCCESSFUL FEMALES AND UNSUCCESSFUL FEMALES

Hence, it may be concluded that the Performance subtests, as a

group, have a limited value in the prediction of academic success among

adult trainees who are generally above average in intelligence. There is,

however, some evidence in the Performance subtest results that the Picture

Completion subtest of the WAIS has a relationship with success. When

taken in perspective with the whole profile of WAIS scores, therefore, the

Picture completion subtest may be useful in supporting an otherwise

tentative prediction concerning the likelihood of success in training.

Verbal I.Q.-Performance I.Q.

In order to test for the possibility that the difference between Verbal I.Q. and Performance I.Q. ratings was related to success among adult trainees, a variable was generated in two ways. Firstly, the absolute difference between the Verbal I.Q. and Performance I.Q. was computed. The group means of differences (whether positive or negative) were then compared on the basis of success and failure among groups.

Secondly, the directional difference between groups was studied by means of a variable which placed the zero difference (when Performance I.Q. was subtracted from Verbal I.Q.) at 35. The results obtained from statistical analysis of the Verbal I.Q. minus Performance I.Q. variable in relation to success are reported in Tables 26 and 27.

Conclusion. Thus, it is evident from a study of Tables 26 and 27 that the Verbal I.Q. minus Performance I.Q. variable showed no discernible relationship with success among adult trainees when applied to the some-what above average I.Q. sample on which this study was based.

TABLE 26

ABSOLUTE DIFFERENCE VERBAL I.Q. MINUS PERFORMANCE I.Q. IN RELATION TO SUCCESS

GROUPS	N	MEAN	S	P
UMT	32	9.47	7.42	0.9999
SMT	43	9.88	6.87	
UFT	15	8.73	7.81	1.0000
SFT	45	8.93	6.06	
SMT (1 sem.)	17	8.71	7.47	0.9560
SFT (1 sem.)	18	6.33	5.29	

TABLE 27

DIRECTIONAL DIFFERENCE BETWEEN VERBAL I.Q. AND PERFORMANCE I.Q. IN RELATION TO SUCCESS

GROUPS	N	MEAN	S	P
UMT	32	42.34	9.59	0.9949
SMT	43	40.79	10.62	
UFT	15	34.40	8.24	0.9526
SFT	45	38.46	10.29	
SMT (1 sem.)	17	33.36	11.55	0.9742
SFT (1 sem.)	18	36.55	8.24	

Full Scale I.Q.

The Full Scale I.Q. variable represents the total measure of all the intellectual factors which are rated by individual WAIS subtests. The results obtained when Full Scale I.Q. ratings were studied in relation to success in adult training are shown in Table 28.

TABLE 28

FULL SCALE I.Q. RATINGS IN RELATION TO SUCCESS

GROUPS	N	MEAN	S	P
UMT	32	110.06	10.17	0.9949
SMT	43	109.39	10.71	
UFT	15	98.00	12.59	Newman-Keuls
SFT	45	106.35	10.21	$p < 0.05$[*]
SMT (1 sem.)	17	111.94	10.21	1.000
SFT (1 sem.)	18	111.33	10.45	

[*]Newman-Keuls Procedure:
Comparing UFT and SFT, multiplier is 2.15347 and critical value is 2.77.

Conclusion. Table 28 reveals that candidates for training who have a Full Scale I.Q. which falls below the average for the general population (100 or less) would appear to be poor risks. In this particular sample

the Full Scale I.Q. was found to discriminate only when applied to female trainees who scored below the general population average. It may be concluded then, that the Full Scale I.Q. provides a very general measure of intelligence level below which applicants for academic high school training have considerably less likelihood of being successful.
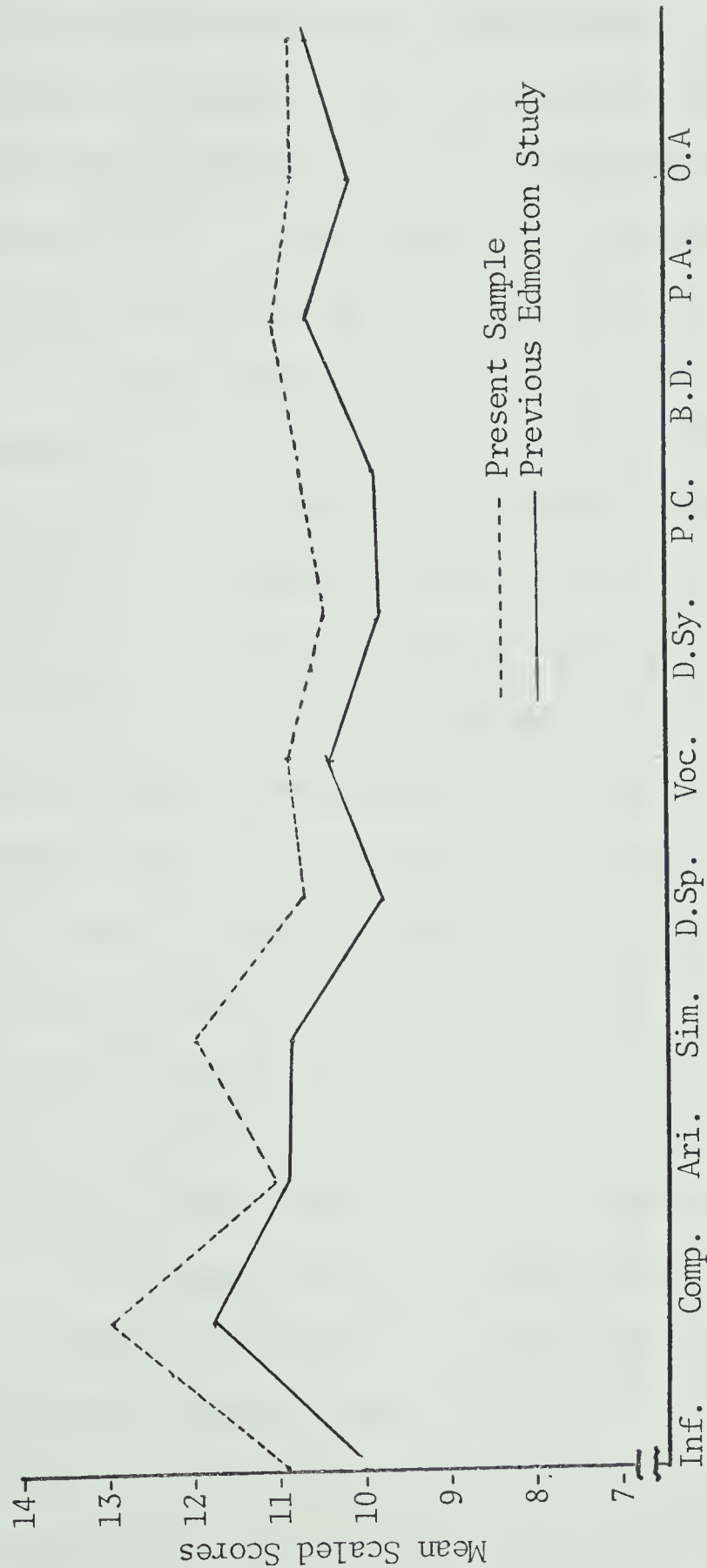
CHAPTER V

DISCUSSION AND IMPLICATIONS

Introduction

When discussing the implications for practice that are inherent in the findings of this study, it will be necessary always to keep in mind that the research sample was pre-selected on the basis of intellectual capacity as well as on the basis of need for further education. Compared with a sample previously selected by a random selection procedure from among trainees in the Edmonton area (Souch, Romaniuk, & Field 1969), the research sample of this study was found to be superior generally in intellectual ability and particularly in Verbal capacity (Figure 9). When drawing inferences from the findings of this study it will be necessary to assume that they apply to adult trainees who have an above average mental capacity. In particular the findings from this research sample will apply mainly to adult trainees who are involved in programs of academic upgrading, many of whom have higher levels of technical and professional training as their goals.

Demographic Considerations

Now that all of the relevant findings from this study can be taken into account, it seems evident that success or lack of success among the adult students in this sample can not be attributed to either demographic or intellectual factors in isolation from the other. In general there seems to have been an interaction involving both demographic and intellective variables in relation to success. Since the unsuccessful male trainees

Mean Scaled Scores

Inf. Comp. Ari. Sim. D.Sp. Voc. D.Sy. P.C. B.D. P.A. O.A

----- Present Sample
————— Previous Edmonton Study

THE SUBTESTS OF THE WECHSLER ADULT INTELLIGENCE SCALE

FIGURE 9

COMPARING THIS RESEARCH SAMPLE WITH THE SAMPLE PREVIOUSLY

STUDIED BY SOUCH, ROMANIUK, & FIELD 1969

Previous sample: n=50,   Present sample: n=170
F.S.I.Q. = 103.34, s=12.02   F.S.I.Q. = 108.2, s=10.85

were found to be, except for slightly less abstract reasoning ability,

intellectually the same as their successful male counterparts it may be

concluded that demographic factors played a major part in their lack of

success. While this study has been able to identify some of the ways in

which males who drop out of training differ demographically from those

who stay on to succeed, there can be no doubt that there are other

aspects of personality, attitude, and motivation still to be explored.

Females who did not succeed, in contrast to the unsuccessful male

group, were found to be very different from their successful women

counterparts when intellective factors were measured. For female

trainees the demographic factors related to lack of success functioned

obviously in conjunction with a lower level of intellectual capacity.

In addition to being very different intellectually, the unsuccessful

women students were also somewhat different demographically from suc-

cessful women. Unsuccessful females more frequently lived at home or

in a boarding house and they had less previous schooling than successful

females in general. These findings indicate that the combination of

limited intellect, fewer grades obtained, and the absence of responsi-

bility for maintaining a place of residence all together showed a

definite relationship with lack of success.

In summary, among the demographic variables examined in this study

the factor of responsibility, as evidenced when maintaining a place of

residence, was the only variable which was found to be related to

success in adult training for both sexes. Among males the further

responsibility of marriage and, to some degree, the fact of having

dependents appeared as variables which were also related to success academically. Hence, for male trainees it was evident that adequate over-all intellectual capacity alone was not enough to ensure success in academic up-grading. For the female trainees it was evident that, in addition to having the factor of responsibility as shown by their willingness to maintain a residence, they too were likely to succeed only if they had an adequate level of intellect (e.g. at least 100 Full Scale I.Q. with strength in Similarities and Picture Completion). In this study, then the successful trainee was a male or female adult who combined responsibility with intellectual capacity (F.S.I.Q. 107.8, S.D. 10.5) adequate for the course of training undertaken.

Intellective Considerations

Consideration is given here to the whole range of findings which have come to light during this examination of intellectual factors related to success. The main contribution of this study is that intellectual factors have been investigated as they are measured by individual subtests of the WAIS. It has been found that, while aggregate measures of intellect have some predictive potential when forecasting success in adult training, it is among the subtest scores of the WAIS that the finer discriminations can be made.

In general, the evidence leads to a conclusion that candidates who fall below the norm for the general population, as rated on the Verbal, Performance and Full Scale I.Q., are potentially much more likely to fail in academic upgrading. Given, however, an aggregate score on intellectual functions which places a candidate above the general pop-

ulation mean the predictive power in the WAIS is then to be found in the configuration of subtest scores.

Among the subtest scores the two measures of mental function which have been found to show particular promise as predictors of success in adult training are the Similarities subtest and the Picture Completion subtest. When the results obtained from the study of these two subtests in relation to success were presented earlier in this paper, it was evident that the power to discriminate between successful and unsuccessful students was considerably more when treating the female portion of the research sample. Since the unsuccessful female group was intellectually inferior to the successful females, it is very possible that the power of discrimination in these two subtests is related to differences of intelligence rather than differences associated with sex.

In order to investigate the possibility that it is a difference of level in intellectual capacity rather than a difference in sex which increases the discriminative power of the Similarities and Picture Completion subtests, some further analyses were made. The results obtained when the research sample was divided into a high intelligence (i.e. the upper 27% of the sample when rated on Full Scale I.Q.) and a low intelligence (i.e. the lower 27% Full Scale I.Q.) group can be seen in Figure 10. When the group of adult trainees, whose general intelligence was in the middle range, was removed from the sample, the power of discrimination in both the Similarities and the Picture Completion subtests was increased. In addition, the Block Design subtest shows a power to discriminate which approaches significance.
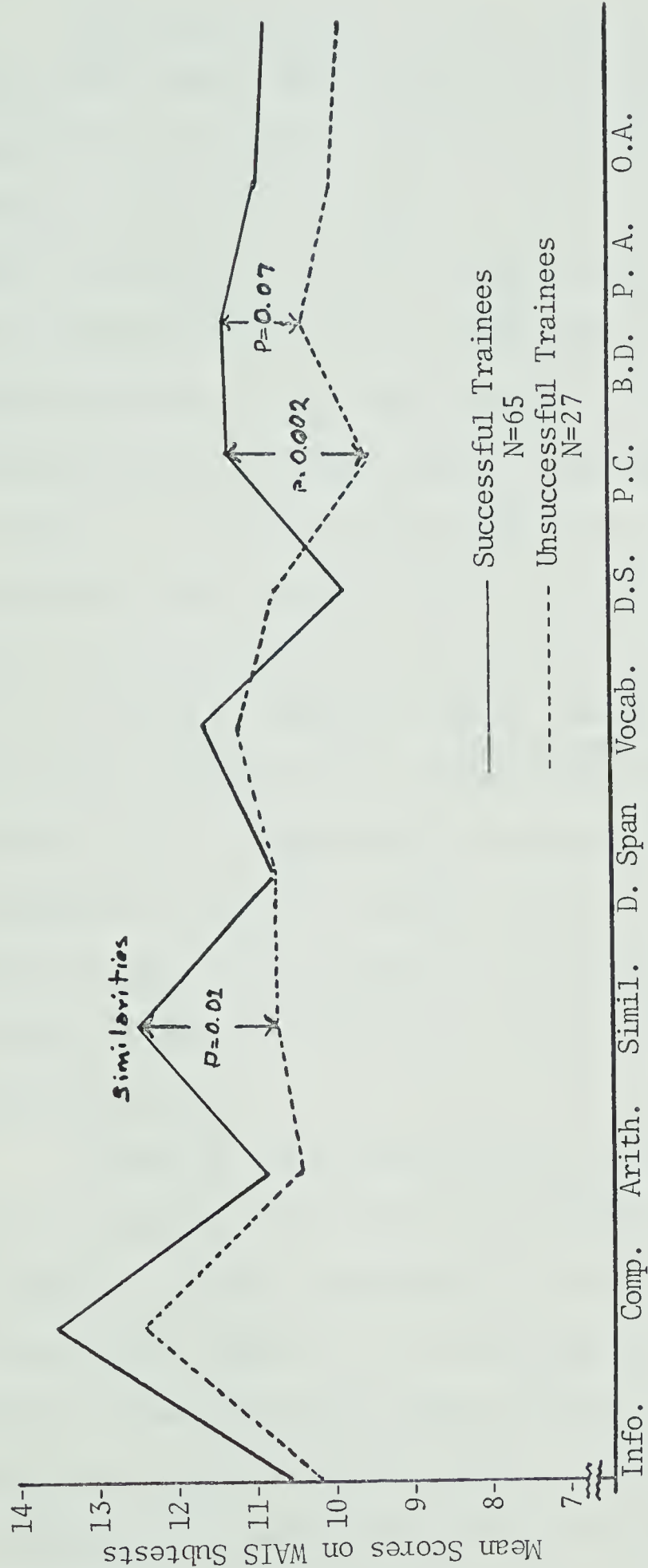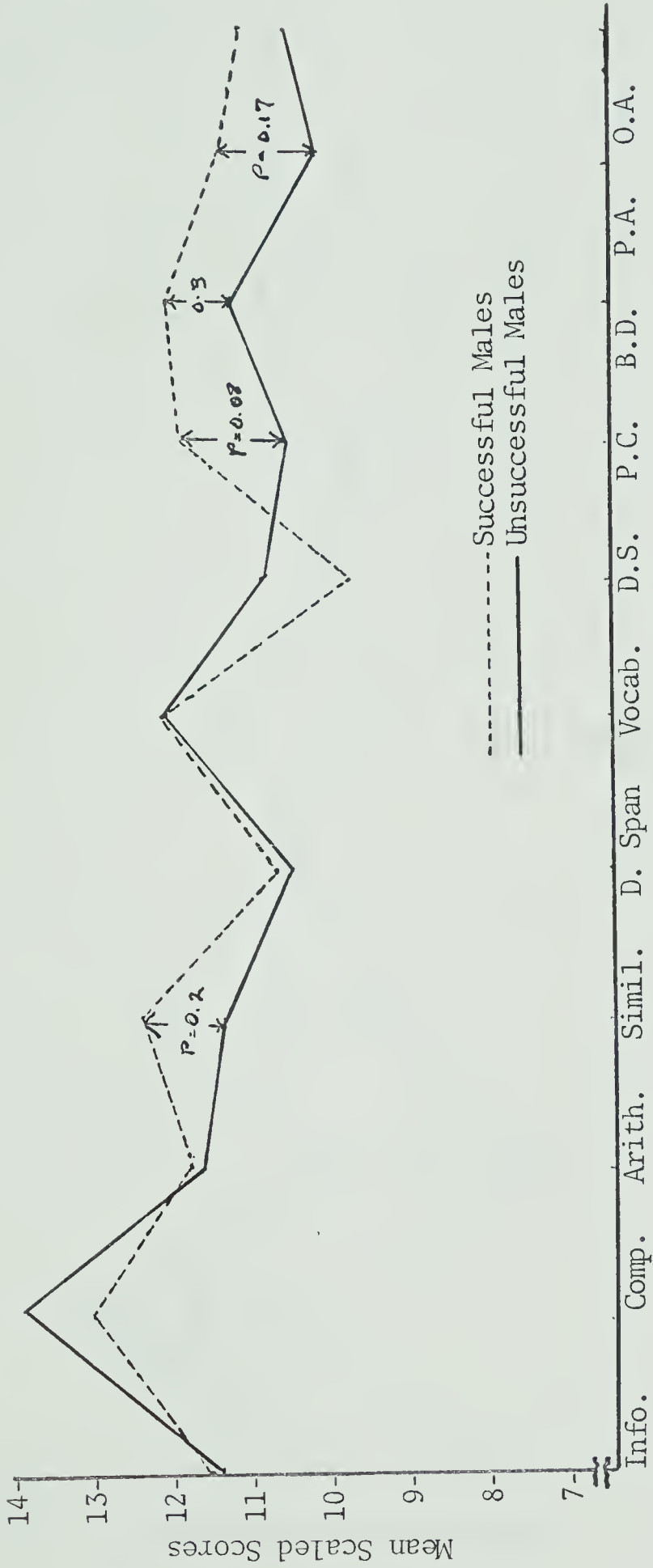
THE SUBTESTS OF THE WECHSLER ADULT INTELLIGENCE SCALE

FIGURE 10

COMPARING HIGH INTELLEGENCE TRAINEES WITH LOW INTELLIGENCE
TRAINEES ON THE BASIS OF SUCCESS

Some further support for the hypothesis that it is difference in I.Q. level rather than differences associated with sex which causes the predictive power of the Similarities and Picture Completion subtests to change, may be seen in Figures 11 and 12. In Figure 11 it may be seen that the Similarities Subtest scores and the Picture Completion subtest scores obtained by successful males show a much stronger upward trend than was evident in the earlier comparison between successful and unsuccessful males without regard to high and low I.Q. ratings (Figures 5 and 7). At the same time, the profiles comparing successful and unsuccessful female trainees show an increase in the power of discrimination inherent in both of these particular subtests when applied to high I.Q. and low I.Q. samples of female trainees (Figure 12). It may also be noted that for females the Comprehension, Arithmetic and Block Design subtests show strong capacity for discrimination in this particular comparison of profiles. However, since these three subtests were not found to have the same power for all trainees when compared on the success-unsuccess variable, they have not been considered important to this discussion.

Hence, it may be concluded with a very high degree of confidence that the Similarities and Picture Completion subtests have considerable predictive validity when applied to the lower limits and the upper limits of the range of I.Q. found among this sample of adult trainees. Moreover the Block Design subtest offers a measure of support for predictions of success which, while not showing the same level of confidence, is nevertheless worthy of consideration in the context of an otherwise weak or strong profile.
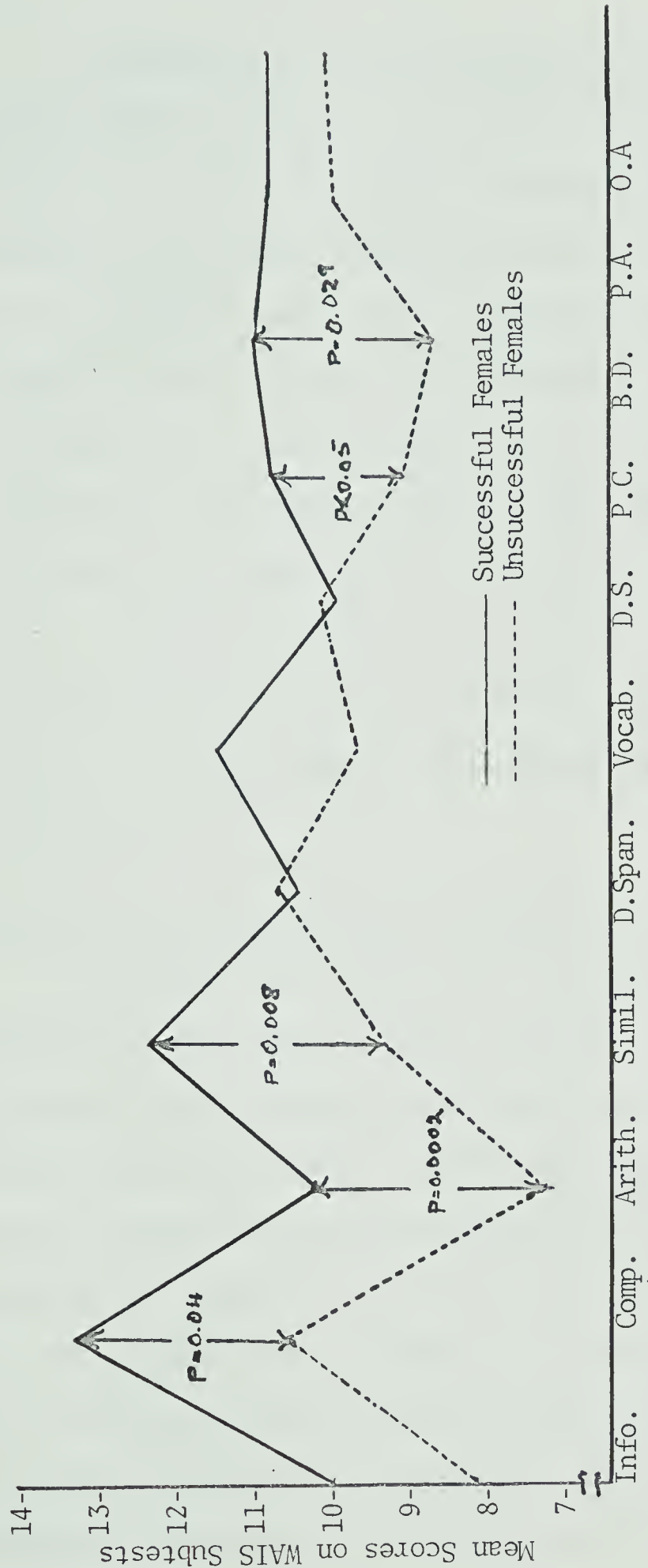
THE SUBTESTS OF THE WECHSLER ADULT INTELLIGENCE SCALE

FIGURE 11

COMPARING HIGH INTELLIGENCE MALES AND LOW INTELLIGENCE MALES
FROM THE RESEARCH SAMPLE

Successful Male N=35   Unsuccessful Males N=15

THE SUBTESTS OF THE WECHSLER ADULT INTELLIGENCE SCALE

FIGURE 12

COMPARING HIGH INTELLIGENCE FEMALES FROM THE SAMPLE AND LOW
INTELLIGENCE FEMALES ON THE BASIS OF SUCCESS

Successful Females N=30   Unsuccessful Females N=12

In summary, it would seem that the aggregate scores obtained during a WAIS assessment, in particular the Verbal I.Q. and the Full Scale I.Q. are effective means of establishing whether or not an applicant for academic upgrading belongs in the range of intellect which promises success. When considering those candidates whose aggregate scores are near the lower limits of the acceptable range (i.e. app 100 or less Full Scale I.Q.) it then becomes advisable to consider the Similarities subtest scores, the Picture Completion subtest scores and , with somewhat less confidence, the Block design subtest scores. When all of these scores together are taken into account the prediction of success or lack of success in academic adult training should now be made with a greater degree of confidence than has previously been the case.

Recapitulation, Integration and Implications

In terms of practice, one of the implications inherent in the findings of this study is that counsellors and administrators who are responsible for selecting candidates for adult training might begin to compare applicants with a tentative profile of success. Within this study it has been found that the typical successful adult male is married, he is maintaining a place of residence and, more frequently than unsuccessful men trainees, he is supporting others. Intellectually the typical adult male success shows his greatest strength when solving practical problems but in addition he shows considerable strength in abstract reasoning as it is measured on the Similarities subtest of the WAIS. In performing tasks requiring intelligence he is at least as

strong as his unsuccessful counterpart in all areas, but has particular strength in perceptual acuity as measured by the WAIS Picture Completion subtest. He is most frequently also strong in perceptual organization as measured by the Block Design subtest of the WAIS.

The typical female success in academic upgrading is no different from her unsuccessful female counterpart in terms of marital status or number of dependents, but she is more frequently maintaining a place of residence for herself and her dependents. Female successes are seldom below the norm for the general population in general intellect and are equally as strong as males in practical reasoning ability. Successful women academic trainees are significantly above their unsuccessful sisters in abstract reasoning as measured by the Similarities subtest of the WAIS and they perform in a superior manner on both the Picture Completion subtest and the Block Design subtest.

It is not being implied that the findings of this study support a contention that those adults who do not conform to a profile of success should be excluded from training. Particularly, any implication that those who were found to be unsuccessful in the course of this study are therefore untrainable is denied by the fact that the males who were lost from training were intellectually equal in almost every way to those who continued on and succeeded. The implication is, rather, that much more research needs to be done into the personal and social factors which led to approximately one-third of the male trainees becoming unsuccessful candidates when they had intellectual ability equal to those who succeeded.

A further implication for the educator and counsellor follows from the discovery that those who dropped out of training were most frequently strong in practical reasoning ability but not as strong in the capacity for reasoning abstractly. On the basis of these findings one is inclined to wonder whether there was not a failure in the process of classroom education to which these male adult trainees were exposed. It seems probable that a fair portion of these persons were lost from highly theoretically oriented classrooms when they were adolescents and they appear to have been lost again from a similar education system when they returned as adults.

Finally, the implication that further research is needed has been obvious throughout this study. The definition of success in terms of one semester of academic upgrading was, of necessity, a very limited measure of success when compared with the ultimate aim of government sponsored vocational upgrading programs. The use of this limited definition of success was, however, justifiable for the purpose of a first research into selection and training procedures now being used. For those concerned a very viable direction for further research would be to explore the role that certain personality, interest and aptitude variables assume in promoting or preventing success among adults in training. Another fruitful direction for research would be to study the relationships between various educational and classroom procedures and the unique needs and potentials inherent in adults who return to the classroom for further training.

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